KOZY KORNER PROJECTS ENVIRONMENTAL ASSESSMENT

Clearwater Unit
Southwest Land Office
Montana Department of Natural Resources and Conservation

April 2018

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Environmental Assessment

Project Name: Kozy Korner Projects
Proposed Implementation Start Date: June 2018
Proponent: Clearwater Unit, Southwest Land Office, Montana DNRC
County: Missoula / Powell

Type and Purpose of Action

Description of Proposed Action:

The Clearwater Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing management activities on up to 2,416 acres in the Kozy Korner area located roughly ten miles northwest of Ovando, MT. The project area is in the area of Woodworth Road between Highway 83 and Highway 200. Please refer to vicinity map Attachment A-1 and project maps**.** The proposed treatments would include multiple projects over time, including commercial timber harvests on approximately 1,630 acres removing an estimated 3-6 million board feet (MMBF) and pre-commercial thinning on approximately 1,500 acres. Prescribed burning (piles or broadcast), tree planting, and weed treatments (chemical, mechanical, or biological) may also occur within the project area. Road maintenance and improvements would be needed on existing roads, as well as some new construction where transportation systems are inadequate (a road running parallel and directly next to a stream, for example) as well as many areas where existing road would be abandoned. This project includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	Sections 20 and 32 T16N R13W	**301**	**171**
Public Buildings	Sections 28, 29, 33 T16N R13W; Section 35 T16N R14W	**1,512**	**1,062**
Pine Hills School	Sections 24 and 26 T16N R14W	**603**	**397**
Total:		**2,416**	**1,630**

Action	Quantity
Proposed Harvest Activities	
Shelterwood	146 acres
Selection	1,428 acres
Selection / Overstory Removal	------
Old Growth Maintenance	56 acres
Total Treatment Acres	**1,630**
Proposed Forest Improvement Treatment	
Pre-commercial Thinning	1,574 acres

Action	Quantity
Planting	*As needed*
Prescribed Burning/Pile Burning	*As needed*

Proposed Road Activities

		Analysis Area	
		Cottonwood Creek	Shanley Creek
Project Area Roads (mi)	Existing	12.8	14.6
	New Construction	0.9	1.5
	Abandoned/Closed	-7.3	-5.2
	Total Road Miles at End of Project	**6.4**	**10.9**
Project Area Roads Within 300 ft of Class 1 Stream (mi)	Existing	4.0	2.2
	New Construction	0.2	0.0
	Abandoned/Closed	-2.6	-1.9
	Total Road Miles at End of Project	**1.6**	**0.3**

Graph also appears as Table WS-4 in Attachment D

Objectives of these projects include:

- Maximize revenue over the long-term for trust accounts from the timber resources and provide a sufficient amount of sawlog volume to contribute to the DNRC's sustained yield as mandated by State Statute *77-5-222, MCA*.
- Manage the identified parcels intensively for healthy and biologically diverse forests to provide long-term income for the trust beneficiaries.
- Bring stands closer to historic conditions.
- Perform old growth maintenance and recruitment treatments to reduce shade tolerant species while maintaining old growth status.
- Improve access and BMP compliance with new construction and road maintenance activities.
- Improve stand growth and vigor and reduce the threat of future losses to fire, insects, and disease.

The lands involved in this proposed project are held in trust by the State of Montana. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (*Section 77-1-202, MCA*).

The DNRC would manage lands involved in this project in accordance with:

- The State Forest Land Management Plan (DNRC 1996)
- Administrative Rules for Forest Management (*ARM 36.11.401* through *471*)
- The Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) (DNRC 2010)
- The Blackfoot Clearwater Game Range Conservation Easement (where applicable)
- All other applicable state and federal laws

Project Development

SCOPING:

- DATE: **August 2015**
- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: http://dnrc.mt.gov/public-interest/public-notices
  - The Scoping Letter was posted within the *Missoulian* (August 16-22, 2015) and the *Pathfinder* (July 30, 2015 and August 6, 2015).
  - It was mailed to those on the statewide scoping list**.**
- AGENCIES SCOPED:
  - Montana Department of Fish, Wildlife, and Parks (FWP)
  - United States Forest Service, Seeley Lake Ranger District
  - Montana Tribal Nations
- COMMENTS RECEIVED:
  DNRC received 4 comments.
  - **Montana Department of Fish, Wildlife, and Parks (FWP)**
    - Concerns: Impact to Grizzly Bears (specifically "bear baths" in section 26); wetlands (habitat); northern bog lemmings.
    - Results (how were concerns addressed): These concerns were addressed in several ways.
      - Implementation of the Streamside Management Zone (SMZ) Law and Rules, HCP, Best Management Practices (BMP's), and all other applicable laws, rules, and plans.
      - Some concerns were dismissed from further consideration due to: the limited scope of this document over other DNRC practices; the lack of feasibility when weighed against DNRC mandates; or DNRC's belief that through project design, site-specific measures and reviews, expected implementation of BMP's and mitigation measures adequate protection would be provided to the listed areas or topics of concern.
  - **Missoula County Community and Planning Services**
    - Concerns: Generally supportive of the project.
  - **Jack Rich (Rich Ranch, DNRC leaseholder)**
    - Concerns: Impacts to recreational trails and fences, weeds. Would like slash piled in a way so he can get his ATV through.
    - Results: A mitigation was developed to machine pile and burn slash in certain areas to allow for grass, shrubs, and trees to grow and improve mobility for weed spraying off roads.
  - **Rob Henrekin (local land owner and grazing lessee)**
    - Concerns: Concern about slash piling.
    - Results: A mitigation was developed to machine pile and burn slash in certain areas to allow for grass, shrubs, and trees to grow and improve mobility for weed spraying off roads.

Internal and external issues and concerns were incorporated into project planning and design and would be implemented in associated contracts.

INTERDISCIPLINARY TEAM (ID):

- Project Leader: Cindy Super
- Archaeologist: Patrick Rennie

- Wildlife Biologist: Garrett Schairer
- Hydrologist & Soil Scientist: Jeff Collins
- Fisheries: Mike Anderson
- Planner: Jessica Thiel

OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

United States Fish & Wildlife Service (USFWS) - DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the USFWS in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at http://dnrc.mt.gov/divisions/trust/forest-management/hcp.

Montana Department of Environmental Quality (DEQ) - DNRC is classified as a major open burner by DEQ and is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

Montana/Idaho Airshed Group - DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit.

Montana Department of Fish, Wildlife and Parks (FWP) - A conservation easement is in place for portions of the project area. Conservation easement land steward Kevin League was consulted to ensure compliance with the easement; FWP biologists Scott Eggeman, Jamie Jonkel, and Kristi DuBois were also consulted during pre-harvest planning. A management plan for the Blackfoot Clearwater Game Range was developed in 2004 and DNRC will follow all commitments outlined in the management plan. A Stream Protection Act Permit (124 Permit) is required from FWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries.

- Culvert replacements would implement erosion control and stream protection and meet the requirements of the FWP 124 permit issued for this project.

ALTERNATIVES CONSIDERED:

NO ACTION ALTERNATIVE:

- The proposed harvest, road maintenance, and forest improvement work would not occur.
- No revenue would be generated for the trust beneficiaries at this time.
- Road systems would not be changed; locations would not be improved and current use (including unregulated use on DNRC land) would continue.

Under the No-Action Alternative, the following stand conditions would persist:

- Stands would remain at overstocked levels and under possible insect and disease threats including mountain pine beetle (*Dendroctonus ponderosae*), spruce budworm (*Choristoneura occidentalis*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), and Armillaria root disease (*Armillaria ostoyae*).
- Concerns regarding overstocked stands and associated fire danger would continue.
- Douglas-fir would continue to overcrowd the western larch and ponderosa pine (desired species for the site); the stands would not be directed toward desired future condition.

- All pre-commercial stands would continue to grow with decreased vigor and would show more death within the stand.

ACTION ALTERNATIVE:

- This proposal includes timber harvest under several timber permits and timber sales on approximately 1,630 acres, removing an estimated 3-6 MMBF. The first timber sale is planned to occur in 2018.
- Stands would have stocking levels reduced and could show a decrease in losses due to insects and disease.
- Road systems would be changed to improve locations and reduce unregulated use on DNRC land, while still allowing for regulated recreational use.
- The risk of extreme fire growth would be lessened across DNRC lands.
- Pre-commercial thinning would increase vigor and reduce overstocking and mortality.
- This action would also reduce established noxious weed populations through weed spraying of existing populations and grass seeding of disturbed areas.
- Generate revenue for three trust beneficiaries (Common School, Public Buildings, and Pine Hills Permanent).
- These stands would be directed toward Desired Future Condition.

Impacts on the Physical Environment

VEGETATION:

Issues and Concerns - The following issue statements were developed during planning and scoping regarding the effects of the proposed action to vegetation:

- Shade tolerant species would continue to out-compete seral species, removing stands from their historic cover type and species distribution.
- Young stands are currently overstocked.
- Forest management activities may result in introduction of new weeds or increased spread of noxious weeds.
- The proposed project could impact populations of threatened, endangered, or sensitive plant species.
- The proposed project could result in heavy concentrations of slash which may result in temporary blocking or reduction of grass for grazing livestock.
- Forest Management activities may adversely impact old growth.
- Armillaria root rot, mountain pine beetle, and western spruce budworm may continue to suppress productivity/growth or cause mortality in the project area.
- Fuel loads/stand conditions are above historic levels, which may lead to high-intensity stand-replacing fires.

Recommended Mitigation Measures for Vegetation - The analysis and levels of effects to vegetation resources are based on implementation of the following mitigation measures.

- Favor western larch and ponderosa pine in harvest areas and pre-commercial thinnings to shift species represented toward the Desired Future Condition.
- Plant western larch and ponderosa pine in planting blocks to shift species represented toward the Desired Future Condition.

- Conduct old growth maintenance treatments to maintain old growth on the landscape.
- Prescribe a selection harvest in order to emulate natural disturbance historically present on the landscape.
- Wash equipment prior to harvest to limit weed seed dispersal.
- Spray weeds along roadsides and landings to limit spread of existing weeds, while preventing weed spraying within sensitive, desirable plant populations.
- Plant grass on newly disturbed road surfaces and burn piles to limit the resources available for weeds to become established
- Machine pile and burn slash in certain areas to allow for grass, shrubs, and trees to grow and improve mobility for weed spraying off roads.

Recommended Mitigations and Adjustments of Treatments for the Benefit of Other Resources

- Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Best Management Practices (BMPs) will be followed, to include no harvest within 100 feet of the Class 1 fishery streams or within 50 feet of Class 2 streams. BMPs relating to wetlands will be followed as well.
- Operating period for commercial timber harvest will be specified to prevent disturbance during critical wildlife activities (denning, nesting, etc).

FOR COMPLETE VEGETATION ANALYSIS SEE *ATTACHMENT B*.

SOILS:

Issues and Concerns- The following issue statements were developed during planning and scoping regarding the effects of the proposed action to soils:

There is a concern that forest management activities may result in increased erosion and reduced soil productivity where excessive disturbance from compaction, displacement, or loss of nutrients occurs, depending on the extent and degree of harvest related soil effects.

Recommended Mitigation Measures for Soils-

The analysis and levels of effects to soil resources with the Action Alternative are based on implementation of the following mitigation measures.

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, Streamside Management Zone laws, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, road construction and road use activities. The commitments of the DNRC HCP would be implemented on the applicable parcels.
- Limit harvest equipment and hauling operations to periods when soils are relatively dry (less than 20%), frozen, or snow covered to minimize soil compaction and rutting, and to maintain drainage features. Check soil moisture conditions prior to equipment start-up. Avoid dispersed skidding unless on snow or frozen ground.
- On tractor harvest units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations to limit trails to 15% or less of the harvest unit. Preference would be placed on existing skid trail use, unless the trail is too steep. Limit ground skidding equipment to slopes less than 40% except for short steep slopes. Feller-bunchers may work on slopes up to 45% as long as displacement and turning is

minimized to prevent excessive disturbance. Slopes over 45% are expected to be cable harvested to reduce soil impacts and improve harvest efficiency.

- On moderate to densely stocked stands, whole tree skidding can reduce slash hazard, but also remove a portion of nutrients from growing sites. Target fine slash and woody debris levels to retain 5-15 tons/acre well distributed on-site while meeting the requirements of the slash law. On thinning sites with lower basal area, retain large woody debris as feasible since it may not be possible to retain 5 tons/acre and the emphasis would be on providing additional coarse woody debris in the future. Slash would be placed on main skid trails to protect soils and reduce erosion potential and potential unauthorized ATV use as needed.
- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP's and to protect water quality.
- Roads that would no longer be used due to relocation would be stabilized from erosion and hydrologically restored to promote conifer growth by reclaiming the road surface. Reclaimed roads would have the surface ripped to 12 inches in depth, relief culverts removed and effectively drained with waterbars, the surface grass seeded, and slash applied.
- Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation. If cut-slope or fill-slope slumps occurred on new roads they would be stabilized to control erosion as part of the harvest project.
- Road use would be limited to dry or frozen ground conditions to reduce rutting and erosion. New road construction, including drainage features, should be completed in the fall prior to freeze-up. Road cutslopes are to be constructed at relatively stable angles as noted in contract Exhibit B. Check snow/frozen ground conditions prior to operations.

FOR COMPLETE SOILS ANALYSIS SEE *ATTACHMENT C.*

WATER RESOURCES:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to water resources:

- There is a concern that the proposed action may cause impacts to water quality from sedimentation that may occur associated with timber management activities, road construction, and road use.
- There is a concern that the proposed timber harvest may cause or contribute to cumulative watershed impacts as a result of increased water yields.

Recommended Mitigation Measures for Water Resources- The analysis and levels of effects to water resources are based on implementation of the following mitigation measures.

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, road construction and road use activities. The commitments of the DNRC HCP and/or the Blackfoot Clearwater WMA Conservation Easement would be implemented on the applicable parcels.
- DNRC would locate, clearly mark and maintain suitable water resource protection boundaries including SMZ's, Riparian Management Zones (RMZ's), Channel Migration Zones (CMZ's) and Wetland Management Zones (WMZ's) adjacent to streams and wetlands consistent with State Forest Land Management rules, the DNRC HCP, and the conservation easement where applicable.
- SMZ's vary from 50 to 100 feet in buffer width. No harvest is proposed in Class 1 stream segments.

- Limit harvest equipment and hauling operations to periods when soils are relatively dry (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- Construct and maintain erosion control features on trails and roads where needed. For skid trails on slopes, install waterbars or well distributed slash on trails as needed to control erosion potential and reduce potential unauthorized ATV use as needed.
- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP's, crossing design 124 permits and to protect water quality.
- All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.
- Roads that would no longer be used due to relocation would be stabilized from erosion and hydrologically restored to promote conifer growth by reclaiming the road surface. Reclaimed roads would have the surface ripped to 12–inches in depth, relief culverts removed and effectively drained with waterbars, the surface grass seeded and slash applied.
- Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation.
- Road use would be limited to dry or frozen ground conditions to reduce rutting and erosion. New road construction, including drainage features, should be completed in the fall prior to freeze-up. Road cutslopes are to be constructed at relatively stable angles as noted in contract Exhibit B. Check snow/frozen ground conditions prior to operations.

FOR COMPLETE WATER RESOURCES ANALYSIS SEE *ATTACHMENT D*.

FISHERIES RESOURCES *(including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to fisheries resources:

- **Riparian Large Woody Debris-** There is a concern for removal of large woody debris and snags from SMZ's or wetlands and the possible disturbance effects of harvest especially along Cottonwood Creek and recommendation of no harvest in the SMZ. DNRC would designate a RMZ width along Class 1 streams based on stand potential tree height and no harvest would occur in SMZ's. RMZ Harvest will retain 50% of trees greater than 8 inches dbh, and will retain all sub-merchantable trees and shrubs from the SMZ boundary to site-potential tree height of 100 feet. Reductions in riparian stand canopy may affect stream shading and subsequently stream temperature.
- **Fish Habitat Connectivity-** One road-stream crossings is known to restrict fish connectivity in Dry Cottonwood Creek. This site will be improved to emulate stream channel conditions and provide passage to all life stages of westslope cutthroat trout in Dry Cottonwood Creek. No new road-stream crossings are proposed on stream supporting fish populations in the project area. Improvements made under the proposed action will improve connectivity, thereby benefitting native trout in the project area.

Recommended Mitigation Measures for Fisheries Resources- The analysis and levels of effects to fisheries resources are based on implementation of the following mitigation measures.

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, DNRC HCP measures and reasonable mitigation and erosion control practices during timber harvest, road maintenance, road construction and road use activities to reduce sedimentation and minimize effects to fisheries.
- DNRC would locate, clearly mark, and maintain suitable water resource protection boundaries including SMZ's, RMZ's, and WMZ's adjacent to streams and wetlands as consistent with State Forest Land Management rules and the BCWMA conservation easement.
- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading, installation of drainage features to prevent surface erosion and sediment delivery to the stream, ditching to improve road surface stability, and gravel surfacing of selected segments as needed to comply with BMP's and protect water quality.
- Road use would be limited to dry or frozen ground conditions to reduce rutting, potential erosion, and sedimentation. New road construction, including drainage features, would be completed in the fall prior to freeze-up. Check snow/frozen ground conditions prior to operations. Minimal effects are expected with snow road construction.
- New roads would be closed to motor vehicles upon completion of harvest activities. Slash would be placed on main skid trails to protect soils and reduce erosion potential and unauthorized ATV use where appropriate.
- Culvert replacements would implement erosion control and stream protection and meet the requirements of the DFWP 124 permit issued for this project.

FOR COMPLETE FISHERIES RESOURCE ANALYSIS SEE *ATTACHMENT E*.

WILDLIFE (terrestrial & avian including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to wildlife:

- Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.
- Proposed activities could alter cover, increase access, and reduce secure areas, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.
- Proposed activities could negatively affect Canada lynx by altering lynx summer foraging habitat, winter foraging habitat, and other suitable habitat, rendering it unsuitable for supporting lynx.
- Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles.
- Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.
- Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.
- Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.
- Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.
- Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range.
- Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

- Proposed activities could negatively affect song birds by disturbing various nesting structures.
- Proposed activities could negatively affect bog lemming habitat or potential habitat.

Recommended Mitigation Measures for Wildlife- The analysis and levels of effects to wildlife are based on implementation of the following mitigation measures.

- A DNRC biologist would be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- If a wolf den is found within 1 mile of active harvest units or within 0.5 miles of a rendezvous site, cease operations and consult a DNRC wildlife biologist for appropriate site-specific mitigations before resuming activities.
- Motorized public access would be restricted on restricted roads that are opened for harvesting activities; signs would be used during active periods and a physical closure (gate, barriers, equipment, etc.) would be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris would be managed according to ARM 36.11.411 through 36.11.414, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while on duty.
- Food, garbage, attractants, and other unnatural bear foods would be stored in a bear-resistant manner.
- Harvesting and thinning would be prohibited between April 1 and June 15 to minimize the potential for disturbance to grizzly bears, bald eagles, and a host of other species.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir, in units in lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.
- DNRC would locate, clearly mark and maintain suitable water resource protection boundaries including SMZ's, RMZ's, and WMZ's adjacent to streams and wetlands as consistent with State Forest Land Management rules and the BCWMA conservation easement.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fire and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Retain a minimum of 100 acres of lynx habitats in the pre-commercial thinning units in the Seeley Lake Lynx Management Area unthinned to provide denser stands for snowshoe hares, targeting stands with higher existing densities.

FOR COMPLETE WILDLIFE ANALYSIS SEE *ATTACHMENT F.*

AESTHETICS

Any change to the scenery in the area from these alternatives would be in addition to past activity within the project area. This analysis includes all past and present effects.

Issues and Concerns- No issues were developed during scoping regarding the effects of the proposed action to aesthetics.

Existing Conditions
The landscapes in the greater area are influenced by glaciation with steep glaciated peaks and lower rolling ridges, or have been carved and formed by the Blackfoot and Clearwater Rivers. The area is near the rural communities of Seeley Lake (to the west) and Ovando (to the southeast). The landscape within the project area is mountainous with deep canyons formed by the streams that still occupy the bottom areas or have remains of tarns, generally along the tops of ridges or benches within the area. Several streams are in the area including Cottonwood Creek, Shanley Creek, and Spring Creek. Benches created by the glaciers and/or streams are moderately to heavily timbered. Several primary road systems such as Highway 200 and Highway 83 are nearby. Any changes within the area from these alternatives would be in addition to past harvests, road building, and other uses within the area. Recent harvest is visible on neighboring properties near the project area. The Rice Ridge fire from 2017 is also visible and dominates the viewshed to the north.

Recommended Mitigation Measures for Aesthetics- The analysis and levels of effects to aesthetics are based on implementation of the following mitigation measures.

- Use topography, openings, and other changes on the ground to make harvest and pre-commercial thinning units less visibly obtrusive.
- Varying densities and using "clumpy" spacing reduces the changes to the scenic integrity of the site.

No Action Alternative:
Direct, Indirect, and Cumulative Effects
The risk of direct effects would be low. Over time, tree growth would be expected to fill in current, naturally occurring openings. The risk of indirect effects would be expected to be insignificant.
The risk of cumulative effects would be low as disturbances from past forest management activities have mostly revegetated.

Action Alternative:
Direct, Indirect, and Cumulative Effects
The timber harvest would not be visible from Highway 83, but would be visible from Highway 200. The harvest would also be apparent from Woodworth Road (a county road), Lower Cottonwood Lakes Road (US Forest Service road #9976), Cottonwood Lakes Road (USFS road #477), and Black Canyon Road (USFS road #4385). In some areas (sections 24 & 26 T16N R14W and sections 20 & 30 T16N R13W), public roads will go directly through the treated stands. Harvest would appear as an extension of other cutting units from the past. Some of the areas of harvest would be blocked from long distance viewing due to topographic changes or potentially flatter land that would be harvested. An experienced observer or someone who resides in the area would notice the changes to the other stands, mostly this would occur due to the decrease in stand density.

Where possible, much of the proposed cutting would be light to moderate in intensity, especially from a distant observation spot. As many of the largest trees would be left, and a random, natural spacing would be used, it would be easier to decrease contrast in form, line, color, and texture between treated and untreated stands

Harvest units on heavily wooded hillsides would be more noticeable. As hillsides become steeper, it becomes easier to notice changes in the vegetation. The plan for these harvest units is to work with topographical features, the minimal openings on the hillside, and to make unit boundaries that aren't constant straight lines. This would show moderate visual impacts in the short-term. Most areas would likely see low to moderate impacts to the aesthetics.

Any change to the scenery in the area from these alternatives would be in addition to past timber harvests, road building, vegetation management (grazing, pre-commercial thinning, etc.), and fire activity within the project area. This analysis includes all past and present effects. Generally, slash disappears from the site within five years, and is often covered by other vegetation within three years. Due to slash and the initial color contrasts of the slash and limited road improvement work, there would be an expected short-term impact. Cumulative effects would be expected to be low given the revegetation of the older harvests nearby, and the time of the proposed actions.

NOISE

Any change to the noise levels in the area from these alternatives would be in addition to past activity within the project area. This analysis includes all past and present effects.

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to noise levels:

- Noise from harvest and hauling activity would impact a guest ranch located in the project area.

Existing Conditions

Noise levels vary on the landscape and result from industrial and recreational uses in the area.

No Action Alternative:

Direct, Indirect, and Cumulative Effects

Noise would not be produced by the proposed project. Other activities within the area (Highway 200, Highway 83, activity in the area) produce noise at this time. All direct, indirect, and cumulative effects of noise would be low.

Action Alternative:

Direct, Indirect, and Cumulative Effects

Harvest activities are typically quite audible, and, depending upon air conditions, equipment can be heard many miles from their location. Noise is generated by harvest operations, harvest related traffic, road construction, and administrative oversight. This could be present for the entire season of harvest, typically from mid-June through mid-November and early December through the end of February, over the two- to three- year duration of the harvest during the general “work week”. Time constraints for hauling may be incorporated in the case where the haul route passes directly next to the guest ranch.

Based on the anticipated operating periods direct, indirect, and cumulative effects of noise are expected to be low.

HISTORICAL AND ARCHEOLOGICAL SITES:

Issues and Concerns- No issue statements were developed during scoping regarding the effects of the proposed action to archeological sites.

Existing Conditions

Montana Tribal Nations were scoped but none identified a specific cultural resource concern. A Class II level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. The Class I portion of the review revealed that no cultural or paleontological resources have been identified in the APE. The pedestrian survey covered the portion of the APE in the E1/2 of Section 29, T16N R13W and the W1/2 of Section 26, T16N R14W. No cultural resources were identified and no additional archaeological investigative work will be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are

identified during project related activities, all work will cease until a professional assessment of such resources can be made.

No Action Alternative:

Direct, Indirect, and Cumulative Effects

No impacts are expected, and low direct, indirect, or cumulative effects are expected on these sites.

Action Alternative:

Direct, Indirect, and Cumulative Effects

Under the proposed action alternative, if any historical or archaeological sites are discovered during the course of the project they would be protected and a DNRC archaeologist would be notified immediately.

Therefore, the proposed action alternative would not be expected to have any direct, indirect, or cumulative effect on historical or archaeological resources.

DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, AND ENERGY:

There would be no measurable direct, indirect, and cumulative impacts related to environmental resources of land, water, air, and energy due to the relatively small size of the timber sale project.

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

- State Forest Land Management Plan EIS, DNRC 1996, sets the strategy that guides DNRC management decisions statewide.
- USFWS and DNRC 2010. Montana Department of Natural Resources and Conservation 'Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II (HCP). U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.
- Blackfoot-Clearwater Wildlife Management Area Conservation Easement and associated management plan, March 2004.

Impacts on the Human Population

HUMAN HEALTH AND SAFETY:

AIR QUALITY

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to air quality:

- Smoke produced during pile burning.
- Dust produced during harvesting and hauling activities.

Existing Conditions:

The DNRC is a member of the Montana/Idaho Airshed Group (Group) which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho

Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006).

The project area is located within Montana Airshed 3B, which encompasses portions of Missoula County and Powell County and includes the Seeley Lake and Missoula impact zones. The project area is does not lie within either impact zone.

Recommended Mitigation Measures for Air Quality- The analysis and levels of effects to air quality are based on implementation of the following mitigation measures:

- Only burn on days approved by the Montana/Idaho Airshed group, Missoula County, and DEQ.
- Conduct test burn to verify good dispersal.
- Dust abatement may be used as necessary.

Slash Burning:

No Action Alternative:

Direct, Indirect, and Cumulative Effects

No slash would be burned within the project area. Other burning by other individuals may occur within the airshed. Thus, there would be no effects to air quality within the local vicinity and throughout Airshed 3B from project-related activities but there may be minimal impacts from other uses.

Action Alternative:

Direct and Indirect Effects

Slash consisting of tree limbs and tops and other vegetative debris would be piled throughout the project area during harvesting. Slash would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter into the local airshed, temporarily affecting local air quality. Over 70% of emissions emitted from prescribed burning are less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous. Within the typical column of biomass burning, the chemical toxics are: Formaldehyde, Acrolein, Acetaldehyde, 1, 4 Butadiene, and Polycyclic Organic Matter.

Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.

Thus, direct and indirect effects to air quality due to slash burning associated with the proposed action would be minimal.

Cumulative Effects

Cumulative effects to air quality would not exceed the levels defined by State of Montana Cooperative Smoke Management Plan (1988) and managed by the Montana/Idaho Airshed Group. Prescribed burning by other nearby airshed cooperators (for example the U.S. Forest Service) would have potential to affect air quality. All cooperators currently operate under the same Airshed Group guidelines. The State, as a member, would burn only on approved days. This should decrease the likelihood of additive cumulative effects. Thus, cumulative effects to air quality due to slash burning associated with the proposed action would also be expected to be minimal.

Dust:

No Action Alternative:

Direct, Indirect, and Cumulative Effects

No dust related to harvesting operations would be generated within the project area. Other dust-generating activities such as recreation may occur. Thus, there is not expected to be dust-related effects to air quality within the local vicinity and throughout Airshed 3B from project-related activities. However, there may be minimal impacts from other uses.

Action Alternative:

Direct, Indirect, and Cumulative Effects

Harvesting operations would be short in duration. Dust may be created from log hauling on portions of native surface roads during summer and fall months.

Direct, indirect, and cumulative effects to air quality due to harvesting and hauling associated with the proposed action would be minimal.

LOG HAULING TRAFFIC

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to log hauling traffic.

- Noise from harvest and hauling activity would impact a guest ranch located in the project area.

Existing Conditions

Log hauling traffic is common in the project area.

Recommended Mitigation Measures for Log Hauling Traffic- The analysis and levels of effects of log hauling traffic is based on implementation of the following mitigation measures:

- Signs would be posted making the public aware of log hauling traffic in the area.
- Log hauling would take place typically from during the general "work week"

No Action Alternative:

Direct, Indirect, and Cumulative Effects

No increase in log truck traffic would occur. Other log truck traffic would still be present due to the project area's proximity to Highways 200 and 83. Thus, there may be minimal impacts to traffic from other users.

Action Alternative:

Direct, Indirect, and Cumulative Effects

Log truck traffic in the area would increase for the duration of the timber sale. However, signs would be posted indicating that log truck traffic is present in the area.

Based on the mitigation measures direct, indirect, and cumulative effects of log hauling on human health and safety would be low.

RECREATION

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to recreation:

- There are concerns that the proposed projects and roadbuilding would impact recreation.

Existing Conditions
The area is used for hiking, hunting, cross-country skiing, horseback riding, snowmobiling, and general recreating. Currently, a majority of the roads through the area are closed to motorized use and used only for administrative purposes.

No Action Alternative:
Direct, Indirect, and Cumulative Effects
There would be no change in road closure status and no change in the ability of people to recreate on these parcels.

There would be no change from existing conditions. Therefore, there would be no measurable direct, indirect, or cumulative impacts on recreation from this proposed action.

Action Alternative:
Direct, Indirect, and Cumulative Effects
There would be no change in road closure status; a minor impact to snowmobiles may be requested along portions of the Cottonwood Lakes Road if hauling occurs during the winter along this road. Historically, log hauling does not preclude snowmobile use, therefore hauling does not occur during snowmobile season on designated snowmobile routes.

Based on the mitigation measures direct, indirect, and cumulative effects of the action alternative on recreation would be low.

Will the No-Action or Action Alternatives result in potential impacts to:	Impact												Can Impact Be Mitigated ?	Comment Number
	Direct				Indirect				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Health and Human Safety	**X**				**X**				**X**					
Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**				**X**					
Quantity and Distribution of Employment	**X**				**X**				**X**					
Local Tax Base and Tax Revenues	**X**				**X**				**X**					
Demand for Government Services	**X**				**X**				**X**					
Density and Distribution of Population and Housing	**X**				**X**				**X**					
Social Structures and Mores	**X**				**X**				**X**					
Cultural Uniqueness and Diversity	**X**				**X**				**X**					
Action														
Health and Human Safety		**X**				**X**				**X**			***YES***	**1**

Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**				**X**					
Quantity and Distribution of Employment		**X**				**X**				**X**			***YES***	**2**
Local Tax Base and Tax Revenues	**X**				**X**				**X**					
Demand for Government Services	**X**				**X**				**X**					
Density and Distribution of Population and Housing	**X**				**X**				**X**					
Social Structures and Mores	**X**				**X**				**X**					
Cultural Uniqueness and Diversity	**X**				**X**				**X**					

Comment Number 1: Health and Human Safety

Impact
Log truck traffic in the area would increase for the duration of the timber sale, which could cause noise and a low impact to human safety.

Mitigations:
- Signs would be posted indicating that log truck traffic is present in the area.

Comment Number 2: Quantity and Distribution of Employment

Impact
According to the Montana Bureau of Business and Economic Research, a general rule of thumb is that for every million board feet of sawtimber harvested in Montana, ten person years of employment occur in the forest products industry.

This harvest is viewed as a continuation of a sustained yield and as such would not create any new jobs but rather sustain approximately 45 person years of employment in the forest products industry. A few short-term jobs would also be created/sustained by issuing pre-commercial thinning and planting contracts following harvest. Additionally, local businesses, such as hotels, grocery stores, and gas stations would likely receive additional revenues from personnel working on the proposed project. This would be a positive low impact to quantity and distribution of employment in the area.

Mitigations: This impact would be positive and mitigations would not be necessary.

OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

The proposed action has a projected harvest volume of 3-6 MMBF. This volume is worth approximately $380.00/thousand board foot (MBF) delivered to a forest product manufacture site at current market prices. Delivered to market, the proposed action has a total estimated revenue value of between $1.14 million and $2.28 million. Removing the timber sale purchaser's contracted operations and DNRC's development, administration, and operation expenses, the trust beneficiaries net between an estimated 15 and 35 percent of total delivered sawlog market value.

Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. These revenue-to-

cost ratios are a measure of economic efficiency. A recent revenue-to-cost ratio of the Southwest Land Office was 1:1.82. This means that, on average, for every $1.00 spent in costs, $1.82 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

Mills in Montana need 351 MMBF per year to maintain current production levels and industry infrastructure. Currently the Sustained Yield and target harvest from Trust Lands is 56.9 MMBF, which represents approximately 16.2% of timber harvested in the state of Montana. This project would provide approximately 3-6 MMBF of timber towards the Sustained Yield target thus helping sustain current mill capacity.

Environmental Assessment Prepared By:

Name: Cynthia N. Super
Title: Clearwater Unit, Management Forester
Date: March 20, 2018

Finding

Alternative Selected

After thorough review of the Kozy Korner Projects Environmental Assessment (EA), project file, and the public scoping, and all applicable rules, plans, and laws, the decision has been made to select the Action Alternative.

The Action Alternative meets the intent of the project objectives as stated in *Type and Purpose of Action* listed on page 3 of the EA. Specifically, the proposed project is expected to:

1) Generate net income between $1.14 million and $2.28 million for the trust beneficiaries involved (Common Schools, Public Buildings, and Pine Hills Permanent School).

2) Promote increased stand health and diversity, decreased fuel loading, and movement towards historic conditions through the harvest of approximately 1,630 acres and pre-commercial thin of up to 1,574 acres (providing funding for this treatment is available).

3) Perform Old Growth Maintenance treatments on areas that are close to the Old Growth status within the 1,630 harvest acres. Also, 6.2 acres of old growth will also be treated with and ITS (Individual Tree Selection) harvest to promote qualities that are beneficial to old growth. These stands would be harvested and would encourage seral trees.

4) Currently the existing roads are approximately 27.1 miles. The proposed action will improve access and BMP compliance with the following activities:

A) Relocation / building of 2.4 miles of road (all restricted)
B) Abandonment or closing of approximately 12.5 miles
C) The final amount of usable road would be approximately 17.3 miles.

5) Decrease visual impacts to the aesthetics of the area through use of topographical features, retention of large trees in the harvest units, uneven tree retention spacing, use of natural grassy openings to break hard visual lines, minimization of openings on hillsides, and uneven boundary lines.

Significance of Potential Impacts

The EA addressed the identified potential resource issues through proposed mitigation measures which incorporate all the applicable rules, plans, guidelines, and laws

This approach resulted in a project in which potential effects to several resources were expected to be negligible, minimal, minor, or low. These resources will not be discussed in further detail.

Others resulted in low to moderate or moderate expected effects. Specifically,

Standard Vegetative Community – Direct, indirect, and cumulative effects are expected to be low to moderate. These effects reflect mitigations and harvest plans designed to benefit forest conditions through promotion of increased stand health and diversity, decreased fuel loading, and movement towards historic/desired future conditions.

Old Growth – Direct, indirect, and cumulative effects are expected to be low to moderate. These effects reflect mitigations and treatments designed to benefit old growth stands through in retention of old growth classification post-harvest and a reduction in the stands' risk of insects, disease, and wildfire.

Aesthetics – Direct and indirect effects are expected to be low to moderate. Proposed mitigations are expected to lessen the potential visual impacts and the visual impacts are expected to lessen or soften over time.

Soils – Direct, indirect, and cumulative effects are expected to be moderate. Proposed mitigations along with contract administration are expected to control potential soil disturbance and avoid excessive impacts.

Water Resources – Direct, indirect, and cumulative effects to sediment are expected to be moderate. Assuming the proper erosion controls are installed and the proposed mitigations are in place, it is expected that water quality and sedimentation will be acceptable. Therefore, changes planned to the road system (drainage) could result in small improvements in conditions when compared to the No Action Alternative.

Fisheries – There is a low to moderate risk to the fisheries concerns assessed for this document. Short term impacts, such as the increases in sediment during construction or culvert replacements, should be easily mitigated. Fish habitat connectivity on Dry Cottonwood Creek will be increased given a change in a road crossing.

Wildlife – A majority of the effects to general wildlife is low to moderate. There is a minor risk of adverse direct or indirect effects for grizzly bears given these projects. Many of the concerns have effective mitigation (timing of operations, reduction of bear attracting items, etc.). A moderate risk of effects is found for Canada lynx however, mostly because a removal of potential winter habitats being removed. Given mitigations like changes in unit layout, protection of streamside and riparian areas, and area of higher stems being left within the units.

Weeds – Direct, indirect, and cumulative effects are expected to be moderate. However, this doesn't differ greatly from the No Action Alternative effects. The major benefit of the Action Alternative would provide for more weed spraying and access to the site (improvements of the road system) than the No Action Alternative and provides mitigations through equipment cleaning and grass seeding (p. 8).

Given the expected effects, rationale, mitigations, and overall project benefits, no significant impacts are expected with the selection of the Action Alternative.

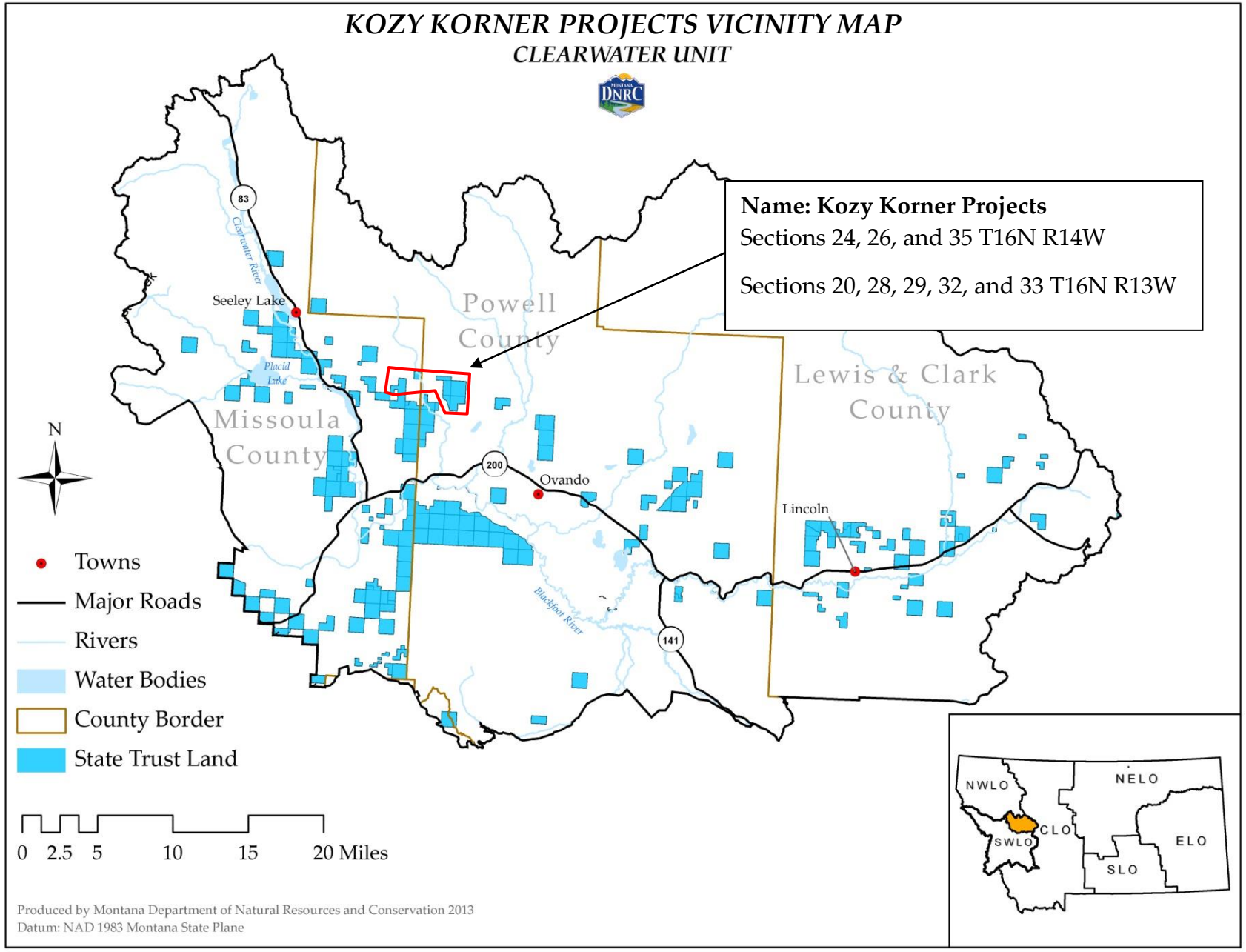
Need for Further Environmental Analysis

☐	EIS	☐	More Detailed EA	X	No Further Analysis

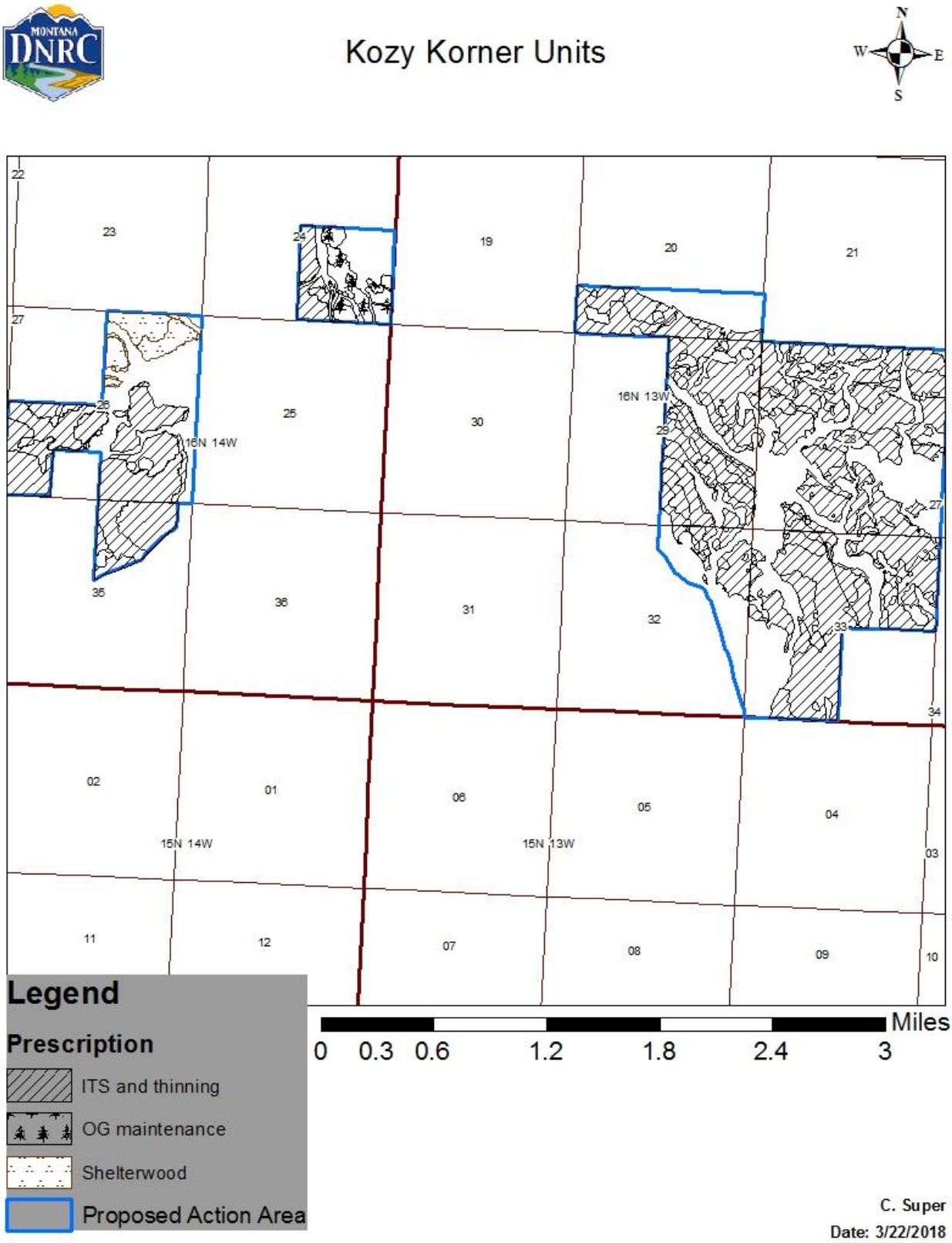
Environmental Assessment Checklist Approved By:

Name: Craig V. Nelson
Title: Clearwater Unit Forest Management Supervisor
Date: April 9, 2018
Signature: /s/ Craig V. Nelson

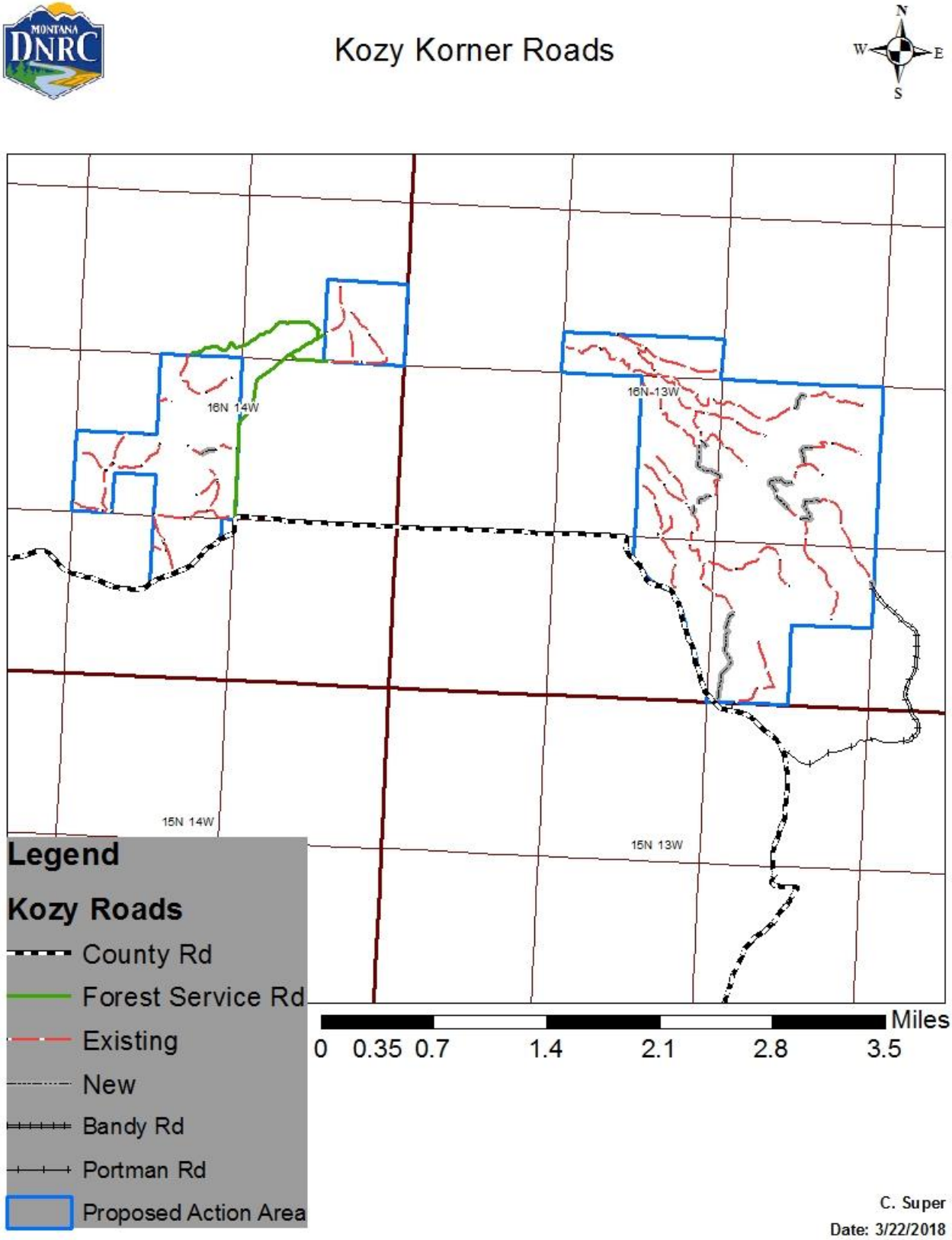
Attachment A - Maps



A-2: Kozy Korner Harvest Units Map



A-3 Kozy Korner Road Map



Attachment B – Vegetative Analysis

Kozy Korner Projects– Vegetation Analysis

Analysis Prepared By:
Name: Cindy Super - Forest Vegetation & Jeff Collins - Noxious Weeds
Title: Management Forester, Clearwater Unit, Montana DNRC & Hydrologist/Soil Scientist, Southwest Land Office, Montana DNRC

Introduction

The vegetation section describes present conditions and components of the forest as well as the anticipated effects of both the No Action and the Action Alternative.

Issues

No-Action Alternative:

- Armillaria root rot, mountain pine beetle, and western spruce budworm may continue to suppress productivity/growth or cause mortality in the project area.
- Young stands are currently overstocked.
- Shade tolerant species would continue to out-compete seral species, removing stands from their historic cover type and species distribution.
- Fuel loads/stand conditions are above historic levels, which may lead to high-intensity stand-replacing fires.

Action Alternative:

- Shade tolerant species would continue to out-compete seral species, removing stands from their historic cover type and species distribution.
- Young stands are currently overstocked.
- Forest management activities may result in introduction of new weeds or increased spread of noxious weeds.
- The proposed project could impact populations of threatened, endangered, or sensitive plant species.
- The proposed project could result in heavy concentrations of slash which may result in temporary blocking or reduction of grass for grazing livestock.
- Forest Management activities may adversely impact old growth.
- Armillaria root rot, mountain pine beetle, and western spruce budworm may continue to suppress productivity/growth or cause mortality in the project area.
- Fuel loads/stand conditions are above historic levels, which may lead to high-intensity stand-replacing fires.

Regulatory Framework

The following plans, rules, and practices have guided this project planning and/or will be implemented during project activities:

State Forest Land Management Plan
DNRC developed the SFLMP to "provide field personnel with consistent policy, direction, and guidance for the management of state forested lands" (DNRC 1996: Executive Summary). The SFLMP provides the philosophical basis, technical rationale, and direction for DNRC's forest management program. The SFLMP is premised on the philosophy that the best way to produce long-term income for the trust beneficiaries is to manage intensively for healthy and biologically diverse forests. In the foreseeable future, timber management will continue to be the primary source of revenue and primary tool for achieving biodiversity objectives on DNRC forested state trust lands.

DNRC Forest Management Rules
DNRC Forest Management Rules (*ARM 36.11.401 through 456*) are the specific legal resource management standards and measures under which DNRC implements the SFLMP and subsequently its forest management program. The Forest Management Rules were adopted in March 2003 and provide the legal framework for DNRC project-level decisions and provide field personnel with consistent policy and direction for managing forested state trust lands. Project design considerations and mitigations developed for this project must comply with applicable Forest Management Rules.

Montana Best Management Practices (BMPs) for Forestry
Montana BMPs consist of forest stewardship practices that reduce forest management impacts to water quality and forest soils. The implementation of BMPs by DNRC is required under *ARM 36.11.422*. Key forestry BMP elements include: streamside management; road design and planning; timber harvesting and site preparation; stream crossing design and installation; winter logging; and hazardous substances storage, handling, and application.

Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP)
DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP.

Blackfoot Clearwater Conservation Easement
This easement granted to Montana Department of Fish, Wildlife & Parks by the Montana DNRC. The purpose of the easement is "to preserve, protect, and enhance in perpetuity the conservation values of the land, particularly the winter-spring habitat for populations of elk, mule deer, and white-tailed deer." The Conservation Easement does not apply to all parcels being considered for treatment but where it does apply it will be followed.

Noxious Weed Applicable Weed Management Requirements All applicable weed management requirements of the County Weed Control Act 7-22-2101 to 7-22-2153, Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes, but is not limited to management rules for classified forest lands ARM 36.11.445 where the department shall use an integrated pest management approach for noxious weed management that includes prevention, education, cultural, biological, and chemical methods as appropriate.

Analysis Areas

Direct and Secondary Effects Analysis Area

The proposed treatment areas – 1,630 acres (harvest and pre-commercial thinning areas)

Cumulative Effects Analysis Area
The proposed project area – 2,416 acres (all acres including riverbeds)

Existing Conditions

Noxious Weeds

Noxious weeds occurring in the project parcels are mainly a combination of spotted knapweed (*Centaurea maculosa*), houndstongue (*Cynoglossum officinale L*), leafy spurge (*Euphorbia esula)*, and spot infestations of Canada thistle (*Cirsium arvense*). Knapweed was found along roadsides as well as in some forested portions of the project area. Houndstongue was found mostly along roadsides along the access haul routes within project sections and on adjacent lands. Orange hawkweed (*Hieracium aurantiacum*) occurs in the area, but has not been noted on the project sites. Road use, livestock and wildlife grazing, timber harvest activities, recreational uses, and soil disturbance from fire are most likely the reasons for the existing rate of spread of noxious weeds and the potential future spread and introduction of noxious weeds. Moist sites with well-established surface vegetation provide a competitive advantage over noxious weed establishment. Reseeding of some roadcuts followed by roadside, spot herbicide treatments and release of bio-control insects have been made on noxious weeds on portions of all of the project sections and this has helped reduced the spread of noxious weeds. DNRC has completed considerable herbicide treatments and revegetation on forest management projects for the last 10 years, coupled with weed treatments by the Montana Department of Fish, Wildlife & Parks (FWP) on system roads. Parts of the Woodworth road and Cottonwood Lakes road have recently been treated by a combined effort with the Lolo National Forest, Powell County, local landowners, DNRC, Montana FWP, and the Blackfoot Challenge. Weeds continue to spread by wind, animals and vehicles. Weed management treatments on adjacent ownerships in the area varies from no action to combinations of revegetation, herbicide treatments and bio-control measures.

Rare Plants

The Montana Natural Heritage Program has identified five possible rare vascular plants that may occur within the general vicinity of the project area.

- English Sundew (*Drosera anglica*) would primarily be found in riparian areas, rivers, lakes, or sloughs.
- Blunt-leaved pondweed (*Potamogeton obtusifolius*) would primarily be found in riparian areas, rivers, lakes, or sloughs.
- Beck water-marigold (*Bidens beckii*) is an aquatic perennial herb with lower stems that are submerged and upper portions usually emergent.
- Pygmy Water-lily (*Nymphaea leibergii*) is an herbaceous perennial with stems that are submerged and floating leaves.
- Howell's Gumweed (*Grindelia howellii*) is a sensitive plant that has limited distribution across portions of Powell and Missoula Counties. In some areas, the populations are well established. This gumweed responds like a pioneer species and requires disturbance for an effective germination substrate. Its habitat is not limited to riparian areas and in fact it is often found on roads or disturbed surfaces.

Standard Vegetative Community

- **Stand History/Past Management**
  This area falls within climatic section 332B. Section 332B was historically 79% forested (Losensky, 1997). Climatic Section 332B includes valley bottoms as well as high elevations in the Bitterrroot and Blackfoot region. The project area ranges in elevation from 4,000'-5,200'. These areas were historically dominated by large, mature ponderosa pine and western larch / Douglas-fir stands. Fire played a large role in shaping these stands. Throughout the project

area there is evidence of both infrequent stand replacing fires and light ground fires. Evidence (fire scars on 200+ year old western larch, ponderosa pine, and Douglas-fir trees and stumps from previous harvests) found during field reconnaissance indicates that these fires burned in the 1800s through today. It is certainly believable that this fire occurrence proceeded that date.

Although fire shaped these stands prior to the arriving of European settlers, much of this area has been treated by timber harvesting since. Harvest has occurred in this area since the late 1880's. Previous treatments were not necessarily done with the same goals as they are currently. As a result, some stands regenerated to a different tree species than the expected appropriate condition.

Some DNRC sales have occurred on these parcels. Our records show treatment dating back to the 1930s and given the history of the area one may assume there were treatments prior to that decade. The Little Shanley Timber Sale treated section 24 T16N R14W in the early 1980s. Section 26 T16N R14W has been primarily treated with small timber permits. The parcels on the east half of the area (those affected sections in T16N R13W) were acquired from the DNRC in 2002 as part of the Blackfoot-Clearwater WMA Phase II Land Exchange with the Montana Department of Fish, Wildlife & Parks and the precise management history is uncertain beyond the fact that there has been previous harvest.

- **Current stand conditions (species composition, size, density, insects and disease, forest age class and distribution, etc.)**

Information for the current stand condition and desired future condition (DFC) was gathered using the DNRC's Stand Level Inventory as well as visual inspection of the existing ground. The current stand condition in the project area is a result of past timber management and wildfire activity and/or suppression. Current cover types differ from the (DFC). See table V-1 for current project area cover types as well as the DFC for the project area.

Table V-1 – Current and appropriate cover type for the Kozy Korner Projects Area.

Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Subalpine fir	N/A	N/A	N/A	N/A
Douglas-fir	24	1%	0	N/A
Lodgepole pine	19	<1%	19	<1%
Mixed conifer	398	16%	47	2%
Ponderosa pine	788	33%	1,241	51%
Western larch/Douglas-fir	1,092	45%	1,014	42%
Western white pine	N/A	N/A	N/A	N/A
Non-stocked	N/A	N/A	0	N/A
Non-forest	85	4%	85	4%
Other (hardwood)	10	<1%	10	<1%
Total:	***2,416***	***100%***	***2,416***	***100%***

Please note; rounding was used in the above table to achieve the given acreages within the sections in this sale.

Most of the stands within the sale area show the increase of Douglas-fir. Trees such as Douglas-fir often regenerate at a more successful rate than trees such as ponderosa pine.

Previous logging practices caused some of these changes. Harvest practices of the late 1800's targeted the best quality trees (straight, fewer limbs, and often the largest stems). This was done using crosscut saws and fewer cuts meant less work. These are usually western larch or ponderosa pine.

By the late 1940's, most harvesting operations used chainsaws to perform the harvesting of the trees on the site. This also included a change in the silvicultural practices that were used. Often seed tree or shelterwood harvests were used. The overstory that was reserved to produce regeneration was harvested after regeneration occurred. The removal of these trees has reduced the larger component of stems on the site, which obviously affects the amount of "old growth" area. This regeneration often included Douglas-fir. The general mindset was to include the maximum amount of spaced trees per acre. On some of the sites, the previous owners continued to remove trees of different species and sizes as time went on. Currently, these stands show a change to Douglas-fir and away from western larch or ponderosa pine.

The overstory across the area consists of 44% Douglas-fir, 12% ponderosa pine, and 10% western larch. Lodgepole pine, which was heavily impacted by mountain pine beetle, accounts for 7% of the overstory and spruce makes up 1%. Aspen, subalpine fir and cottonwood are also present on approximately 1% of the overstory net acres. The heaviest overstory removal (50-75%) would be in the Douglas-fir in an effort to move these stands towards desired future condition of Douglas-fir/Larch or ponderosa pine.

Stands within the area have average diameters of 10.8 inches. Average height across stands is 55 feet. The volume over the area is approximately 3.1 thousand board feet (MBF) per acre. The "smallest" stand results (not including non-forested stands) had stand DBH of 1, stand height of 10 feet, and zero MBF per acre; the "largest" stand totals were 18 inches at breast height, 90 feet tall, and the volume of 11-15 MBF. per acre. Harvest of the largest diameter trees will be less than 50% of the existing stand.

Several small (less than five acres) stands of Aspen are present. In many cases, these pockets have Aspen mixed directly with conifers, hawthorn and/or dogwood in the under-story, and snowberry / Oregon grape. Several sites were visited in the spring of 2017, following a heavy snow year. In many cases, water wasn't present even during this year.

Armillaria root disease is present in much of the area as well as large pockets of mortality from mountain pine beetle, Douglas-fir beetle, and most recently snow/wind throw. The recent damage from snow is primarily in the second story Douglas-fir and impacted approximately 10% of the existing stand.

Old Growth

Old growth is identified and analyzed using criteria outlined in Green et al. (1992). Stand Level Inventories (SLI) of the project area were queried to identify potential old growth and old growth stands. Stands are categorized as: Possible, Yes, No, and Field Verified. Only two stands in the sale area were identified as any type of old growth and listed in SLI as "Possible." One of these stands was field verified as "Yes." Old growth maintenance harvest will happen in stands that are in old growth status.

Table V-2 –Old Growth in project area

Stand ID (as	SLI Old	Acres	*Field	Old Growth	Acres of

classified by DNRC Stand Level Inventory)	Growth Status		Verified Old Growth Status	Type	verified Old Growth
16N14W2400003	**Possible**	**31.3**	**No**	**--**	**31.3**
16N14W2400008	**Possible**	**13.4**	**Yes**	**P**	**13.4**
TOTAL	**-**		**-**		**13.4 acres**

Environmental Effects

Environmental Effects on Noxious Weeds

No-Action Alternative: Direct, Indirect, and Cumulative Effects on Noxious Weeds

With no action, noxious weeds will continue to spread along roads and may increase on the drier site habitats. Limited weed control efforts on access roads across multiple ownerships in the area, increases the potential for windblown seed. Following disturbance events such as fires, or grazing, the establishment and spread of noxious weeds can be more prevalent than in undisturbed areas. DNRC would continue to treat selected sites on DNRC roads based on priorities and funding availability, but the levels of weed control treatments would be lower than with the action alternative. If new weed invader species are found they would have highest priority for management. On state land parcels the grazing licensees would be required to continue weed control efforts consistent with their use.

Cumulative effects of noxious weeds within the project areas are moderate. Weeds have spread across ownerships over time by multiple uses from wind, fire, traffic, forest management, wildlife and grazing animals. As tree density and ground cover vegetation increase over time, weeds are reduced through vegetative competition.

Action Alternative: Direct, Indirect, and Cumulative Effects on Noxious Weeds

Implementation of the action alternative will involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. For the action alternative, an Integrated Weed Management (IWM) approach was considered for treatment of existing and prevention of potential noxious weeds. For this project, prevention, revegetation of new roads, and weed control measures on existing roads are considered the most effective weed management treatments.

Prevention measures would require clean off-road equipment. Roadsides would be sprayed prior to operations and weed control and revegetation would slow noxious weed spread and reduce weed density and occurrence compared to no-action. There would be a similar or potential slight increase in weed infestation within harvest units due to soil disturbance and reduction of tree canopy. The silvicultural prescriptions are designed to control disturbance and scarification to goals need for sustained forest growth and the predominant cable harvest would result in low disturbance. Noxious weeds control efforts will promote rapid revegetation and emphasize treatment of any new noxious weeds found.

Herbicide application would be completed on segments of DNRC roads along the haul route, to reduce weed spread along roads and promote desired vegetation for weed competition and to reduce sedimentation. Herbicide would be applied according to labeled directions, laws and rules, and would be applied with adequate buffers to prevent herbicide

runoff to surface water resources. Implementation of IWM measures listed in the mitigations are expected to reduce existing weeds, limit the possible spread of weeds, and improve current conditions, to promote existing native vegetation. More weed control would occur compared to the no-action alternative and grass and competitive vegetation would increase along roads. Slash would be piled in areas where grazing occurs to facilitate ATV access for off-road weed spraying.

Overall cumulative effects of increased noxious weeds within the project area are expected to be moderate. This is based on herbicide treatments of existing weeds along roads and implementing prevention measures to reduce new weeds, by cleaning equipment and planting grass on roads to compete against weeds. The combined efforts of weed control across ownerships continues to improve through cooperative efforts with the County Weed Districts and local weed control interest groups.

Rare Plants

No Action Alternative:

Direct, Indirect, and Cumulative Effects

The No Action alternative would not change the existing conditions available for Howell's gumweed populations present within the proposed area. No disturbance would occur. As a result, there would be low risk of direct, indirect, and cumulative effects to Howell's gumweed given the No-Action Alternative.

Action Alternative:

Direct, Indirect, Cumulative Effects

If a population is found, disturbance would be limited, and based on the fact that Howell's gumweed is often found in disturbed areas, and the gumweed population should remain the same or would slightly increase if plants establish on reclaimed road sites. Some individual plants would likely be killed if present during timber harvest. Core populations would be protected and potentially enhanced through the ground disturbance nearby. If a population is found, mitigations would be put in place during herbicide application to protect the plants.

Given the limited area that Howell's gumweed inhabits and the protective measures that will be taken, there will not be any adverse cumulative effects. There may be an increase in the gumweed population as disturbance would cause an increase in adequate germination substrates. As a result, there would be low risk of direct, indirect, and cumulative effects.

Standard Vegetative Community

No Action Alternative:

Direct, Indirect, and Cumulative Effects

Under the No Action alternative, natural processes would continue to have a direct impact on forest conditions within the Project Area. The proposed harvest, road building and closures, and pre-commercial thinning would not occur. These stands would remain at overstocked levels and are they are currently under the possible insect and disease threat of mountain pine beetle (*Dendroctonus ponderosae*) and spruce budworm (*Choristoneura occidentalis*). Many existing roads are in poor locations. Concerns regarding overstocked stands and fire danger from them would continue. Current threat of uncontrollable fire conditions would not be lessened in this area. All pre-commercial stands would continue to grow with decreased vigor and would show more death within the stand. As a result, there would be low to moderate risk of direct, indirect, and cumulative impacts to the vegetative community given the No Action alternative.

Action Alternative:

Direct, Indirect, and Cumulative Effects

This proposal includes timber harvest on approximately 1,630 acres removing an estimated 3-6 million board feet. Pre-commercial thinning will also occur under this EA on a proposed 1,500 acres. Treatment type and size would vary based on stand conditions. The proposed treatment types would include:

Shelterwood: Shelterwood harvest is a traditional prescription that is a "regenerative" harvest and would occur on approximately 100 acres. This is designed to produce regeneration of a preferred tree species that has been chosen and has be left as a "shelter" above the regeneration. These stands within the project area are generally higher percentage of Douglas-fir and do not have an understory that could be managed after harvest. Spacing after harvest is predicted to be variable and would be based upon the individual tree characteristics. The reduction of the overstory and treatment of the existing pole size and understory trees generally causes a stand to produce regeneration of the remaining overstory. The reduction of the total Douglas-fir number of the overstory, and a percentage increase of other species (ponderosa pine and western larch) would promote a stand closer to pre-settlement times. The proposed stand density would make limited resources (light, water, and nutrients) more plentiful for the residual overstory trees and potential regeneration. These changes would continue the progression toward the Desired Future Condition.

Old Growth Maintenance: The definition is found in the Administrative Rules for Forest Management 36.11.403 and is as follows: *"Old growth maintenance" means silviculture treatments in old growth stands designed to retain old growth attributes, including large live trees, snags, and coarse woody debris, but that would remove encroaching shade-tolerant species, create small canopy gaps generally less than one acre in size, and encourage regeneration of shade-intolerant species. This type of treatment is applicable on sites that historically would be characterized by mixed severity fire regimes, either relatively frequent or infrequent.* Old growth maintenance would primarily be focused in section 24 T16N R14W on approximately 6.2 acres.

Individual Tree Section (ITS): The goal would be to retain heathy seral species (PP or WL) exhibiting desirable phenotypical attributes (good form, no forked tops, no crook, sweep, etc.). Residual overstory spacing (averaging 20-30 feet) would be variable or clumpy depending on stand health; Post-harvest, stand appearance would resemble a natural disturbance with scattered clumps remaining as well as unevenly spaced overstory trees. Approximately 50-65% of the total canopy on 1,524 acres would be removed using this treatment.

Pre-Commercial Thinning: The treatment of pre-commercial thinning is defined as removing small trees not for monetary benefit but to reduce stand stocking, release of limited nutrients (water, light, and nutrients), and improve growth of desired trees. It has also proven to decrease the loss of deterioration through death and poor growth over a longer time period, especially on poor sites. Old growth is not a concern within this size class, but there are concerns for Canada Lynx in this area.

At least two snags and two snag recruits per acre (where available) would exist scattered among the overstory component of all harvest units. If snags were not available, 4 snag recruits would be left.

Healthy, vigorous advanced regeneration exhibiting good form would be protected during harvest activities.

Harvest would not occur within the first 50 feet of Class One Streamside Management Zones (SMZ). Depending on slope, these areas vary from 50 feet -100 feet from the stream. Harvest may take place within Class 3 Streamside Management Zones or around Wetland Management Zones (WMZ). Trees marked to cut would be concentrated along the outer edges to ensure protection along stream banks.

Fuel loading concerns would vary according to the pre-harvest stand. In accordance with ARM 36.11.410 and ARM 36.11.414 the majority of fine foliar slash and approximately 5 to 15 tons of coarse woody debris would be left scattered on the forest floor in all harvest units. This would increase the intensity and reduce the ability to control ground fires in

all harvest units for approximately three years. In stands that have numerous leave trees following harvest, this could result in ground fires killing trees and an increased risk of crown fires. In areas with few leave trees the risk of a catastrophic crown fire would decrease.

Given the following factors:

- Douglas-fir across all size classes are currently succumbing to root-rot, spruce budworm, and Doug-fir beetle due in part to overstocking.
- Post-harvest, the overall stand health and vigor would be improved in the residual overstory.
- More shade tolerant species would be removed, favoring seral species.
- Areas would be pre-commercially thinned increasing growth and vigor in young age classes.
- Post-harvest conditions would represent a more diverse age and species class within the project area; promoting resiliency to insect and disease damage.

The proposed action would be expected to result in low to moderate direct, indirect, and cumulative impacts on forest vegetation beyond those projected for the No Action alternative.

Old Growth

No Action Alternative:

Direct, Indirect, and Cumulative Effects

The No Action alternative would not change the existing conditions available within the proposed area. No disturbance would occur as part of the no action alternative. It is likely that given a longer time period, old growth acres would increase. At the same instance, the stands that occur currently would be at larger risk for wildfire. As a result, there would be low risk of direct, indirect, and cumulative effects to old growth given the No-Action Alternative.

Action Alternative:

Direct, Indirect, and Cumulative Effects

Based on a search of the Stand Level Inventory system, nearly 45 acres of old growth may exist within the project area (as defined by Green et. al.). Of that, 13.4 acres were field verified. Currently, 6.2 acres of old growth exist within the treatment area. The following table illustrates acres pre and post-harvest conditions for the treatment area (direct and secondary effects analysis area) and the project area (Cumulative effects analysis area).

Stand Id.	Desired Future Condition	Current Cover Type	Acres of Old Growth	Acres Treated	Prescription
16N14W2400008	WL/DF	MC	**13.4**	0	N/A
16N14W2400003	PP	MC	**31.3**	6.2	OG Maint.
TOTALS			**45**	**6.2**	

Stands containing old growth are intermixed with non-old growth stands throughout both the project area and the treatment area. Within the treatment area, stands containing old growth would receive old growth maintenance treatment. This treatment would be designed to retain old growth attributes, including large live trees and snags. Shade tolerant species are targeted for removal. This prescription is consistent with the selection treatment mentioned earlier in the standard vegetative community effects analysis. Post-harvest stands would retain old growth classification.

Given the following factors:

- Post treatment all stands would retain old growth classification

- If left untreated, stands that currently are classified as old growth areas may be at risk of insects (such as mountain pine beetle or spruce budworm), disease (root rot), or the potential of wildfire may no longer meet old growth classification because of ongoing mortality.
- Shade tolerant species would be removed, favoring seral species historically present on the site

The proposed action would be expected to result in low to moderate direct, indirect, and cumulative impacts on old growth beyond those projected for the no action alternative.

Vegetation Mitigations

- Favor western larch and ponderosa pine in harvest areas and pre-commercial thinning to shift species represented toward the accepted Desired Future Condition.
- Plant western larch and ponderosa pine in planting blocks to shift species represented toward the accepted Desired Future Condition.
- Conduct old growth maintenance treatments to maintain old growth on the landscape.
- Prescribe a selection harvest in order to emulate natural disturbance historically present on the landscape.
- Wash equipment prior to harvest to limit weed seed dispersal.
- Spray weeds along roadsides to limit spread of existing weed, while preventing weed spraying within Howell's gumweed populations.
- Plant grass on newly disturbed road surfaces to limit the resources available for weeds to become established.
- Pile slash in areas where livestock grazing occurs to allow ATV access for weed spraying.

Recommended Mitigations and Adjustments of Treatments for the Benefit of Other Resources

- Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- No harvest would occur near within 50 feet of Class 1 streams.

VEGETATION REFERENCES

MT DNRC , Environmental Assessments of the past DNRC timber sales including: Shoup-Jones EA, 2010; Jockly Lakes Fire Salvage Timber Sales, 2007; Clearview Projects EA, 2015; and minor salvage permits, Clearwater Unit, Southwestern Land Office.

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Attachment C – Soil Analysis

Kozy-Korner Timber Sale – Soil Analysis

Analysis Prepared By: Jeff Collins, Hydrologist/Soil Scientist, DNRC

Introduction

The following analysis will describe the existing soil conditions and the anticipated effects to soil resources and noxious weeds within the Kozy Korner project area. Direct, indirect, and cumulative effects to soil resources and noxious weeds of both the No-Action and Action alternatives will be analyzed.

Issues

Soil Resources/Geology – There is a concern that forest management activities may result in increased erosion and reduced soil productivity where excessive disturbance from compaction, displacement, or loss of nutrients occurs, depending on the extent and degree of harvest related soil effects. Road construction and timber management activities on unstable geologic material can cause slope instability.

Regulatory Framework

The following plans, rules, and practices have guided this project planning and/or will be implemented during project activities:

All applicable Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes, but is not limited to silviculture considerations for sustained forest growth (ARM 36.11.420) and biodiversity. As required by ARM 36.11.410 and 36.11.414, adequate vegetative debris shall be left on site to support nutrient conservation whole tree skidding shall be discouraged unless mitigation measures are taken to retain a portion of (fine litter) nutrients on site. The proportions of vegetative materials retained are based on the range of comparable levels determined by Graham et al (1994).

Analysis Methods & Analysis Areas

The methods for disclosing impacts for this analysis include using general soil descriptions and management limitations and then qualitatively assess the risk of negative effects to soil productivity from compaction, displacement and erosion from each alternative.

The soils analysis included an evaluation of Powell County Soil Survey data, and Lolo National Forest Soil Survey, air photos, geology maps, past harvest designs and on-site field reviews by a U of I soil scientist. For the purposes of this analysis, minor soils of 5% or less of the area were grouped based on slope, soil properties and interpretations. Field

reviews were conducted to verify the soil properties and current conditions to assess past and predicted effects based on DNRC soil monitoring results from over 80 DNRC postharvest monitoring projects (DNRC, 2006, 2011). The soil analysis considered soil management interpretations and the physical effects to soils from the area and degree of harvest disturbance associated with skidding and roads. The analysis for soil nutrients considers the area of disturbed surface and the fine litter and coarse woody debris available to supply organic materials to the soil. While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

Direct, Indirect and Cumulative Effects Analysis Areas The analysis area for geology and soil resources includes the proposed harvest units and locations of existing roads and the new and temporary roads proposed for construction on State Trust Land Parcels within portions of Sections: 20, 28, 29, 32 & 33, T16N R13W. Sections: 24, 26 & 35, T16N R14W

Existing Conditions

The bedrock geology in the project area includes Pre-Cambrian age limestones, argillites and quartzites that are mainly well fractured. The proposed harvest areas are located on the glacial and alluvial footslopes of the lower of the lower Cottonwood Creek valley and Shanley Creek drainages that are west of Ovando, Montana. The area is characterized by low sloping glacial outwash and alluvial fans with silty glacial till and cobbly outwash deposits forming rolling hills and knobs. The glacial and alluvial deposits are underlain by older clayey tertiary age deposits that are exposed in localized areas and material types change within a short distance from mainly coarse gravels to included areas of clayey soils. Wetlands and areas of seasonal high-water tables occur adjacent to streams in the area as well as small “Kettle” pothole wetlands that may seasonally dry out. Kettles were formed when blocks of glacial ice were buried or deposited in glacial till and outwash, and then melted out to leave a depression. Somewhat poorly drained soils (aquolls, aquents) also occur around wetlands and within riparian areas and support mainly a complex of riparian shrubs, aspen, cottonwood, deep sod grasslands with sedges and some spruce. Some of the aquoll wetland soils are of small scale adjacent to wetlands and not mapped at this scale. These soils require wetland management zone delineation (WMZ) and site-specific review for operations adjacent to the wetlands. Spring snowmelt from higher elevations raises the water table in the coarse textured alluvial and outwash materials throughout the area in glacial potholes and wetlands that are extensive for a short duration in the spring.

Primary soils concerns are avoiding displacement or rutting of the shallow surface soils. Erosion risk can be effectively controlled with standard drainage practices and implementation of BMP’s. Moderate slopes of 30-45% are well suited to ground based skidding operations and have a long operational season of use, once soils dry out in the spring. Slope steepness over 45% limits tractor operations due to potential for excessive disturbance and erosion. Cable operations on steeper slopes reduce ground disturbance and impacts. Sediment delivery is concern on the finer textured soils within and adjacent to riparian areas yet can be mitigated by implementation of Streamside Management Zone/ Riparian Management Zone buffer areas and implementation of Best Management Practices (BMP’s).

Table ST-1- Major Soil Types in the Kozy Korner Projects Project Area

The following represent the major soil types of the project area. Minor and included soil descriptions are referenced to the County Soil Surveys & considered in analysis						
	Mapping Unit Name	**Soil Description**	**Erosion Potential**	**Displacement hazard**	**Compaction Hazard**	Notes

6	**Wetlands-Meadows Aquents-aquolls complex, 0 to 4 percent slopes**	Wetlands Deep, Poorly drained soils	Low	Avoid, Subject to rutting. Site specific winter operations may be feasible.	Avoid, Subject to rutting. Site specific winter operations may be feasible.	Locate Wetland Management Zones WMZ, around wetland perimeter, Site specific reviews required
699D	**Bignell Gravelly Loams, 8-35 percent slopes Glacial till & colluvium** **66% % of Area**	Well drained, Thick Gr. Loam surface over deep Gravelly clay loam subsoils	Moderate K .24,	Moderate	Prone to rutting and compaction if operated on when wet	Productive soils suited to Ponderosa Pine, Douglas fir, Larch. Check soil moisture prior to operations
124,125,127, 129,132, 371	**Complexs of Winfall, Wildgen, Winkler gravelly loams on 4-30% slopes, Glacial till** **20% of Area**	Well drained, Thick Gr. Loam surface over deep Gr. & cobbly clay loam subsoils	Moderate K .20	Moderate	Moderate Prone to rutting and compaction if operated on when wet,	Productive soils suited to Ponderosa Pine, Douglas fir and Lodgepole
41B 75, 95, 105,106,395	**Rumblecreek, Perma Totelake Gravelly loams 4-30% slopes & includes isolated wetlands, potholes Glacial till, alluvium 10.8% of Area**	Well drained, Thick Gr. Loam surface over deep Gr. & cobbly clay loam subsoils Includes poorly drained soils under pothole wetlands	Moderate K .20	Moderate	Moderate Prone to rutting and compaction if operated on when wet,	Productive soils suited to Ponderosa Pine, Douglas fir and Lodgepole Locate Wetland Management Zones WMZ, around wetland perimeter
124,125,130, 371C,	**Wildgen-Winkler-Winfall gravelly loams on 4-30% slopes**	Well drained, Thick Gr. Loam surface over deep Gr. & cobbly clay loam subsoils	Moderate K .20	Moderate	Moderate Prone to rutting and compaction if operated on when wet,	Productive soils suited to Ponderosa Pine, Douglas fir and Lodgepole
54	**Hollandlake-Bata complex, 4 to 30 percent slopes**	Well drained, Thick Gr. Loam surface over deep Gr. & cobbly clay loam subsoils	Moderate K .20	Moderate	Moderate Prone to rutting and compaction if operated on when wet,	Productive soils suited to Ponderosa Pine, Douglas fir and Lodgepole
786F	**Soil units with slopes of 30-60 less than 1% of area**	Well drained, Deep Gr. loams and Gr. Silt loams	Moderate K .02-.2 Increases on steeper	Moderate High on slopes> 45%	Moderate Generally short period of wet conditions,	Productive soils. Limit ground skidding to slopes < 45%

			slopes			

Erosion Factor **K** indicates the susceptibility of a soil to sheet and rill erosion and considers rock fragments. K of .02 is low and .69 is highest

The dominant soils on the western portion of the project are Bignell deep gravelly loams on 4-30% slopes that occur on (66% of the area). Bignell soils are moderately well-drained, moderate productivity soils and support mainly Douglas-fir, larch, lodgepole pine and Ponderosa pine. North and east aspects and more moist areas support larch. Bignell soils have a gravelly silt loam surface over deep gravelly clay loam subsoils (refer to soil table ST-1 and soil map S-1 in project file).

Bignell soils have a moderate season of use, once soils are relatively dray in late spring, yet are subject to rutting and compaction if operated on in the spring when wet. Erosion risk is low on these gentle slopes. Vegetative competition is moderate and may limit larch establishment unless scarified or prescribed burned. These materials are poor too good for road construction depending on the location, and the amount of subsurface clay materials can change within a short distance.

Wildgen, Winfall and Winkler deep gravelly loams and extremely stony loams occur on 20% of the forested sites. These soils are well drained and tend to be droughty with a long season of use, which is in part why there is little surface runoff. Material quality is good for road construction, but high cobble content can lead to rough roads. These soils are subject to rutting and compaction if operated on in the spring when wet. This limitation can be overcome by limiting operations to dry summer periods or winter conditions. Erosion risk is moderate on slopes up to 45%. No high erosion potential soils were identified. Excessive soil disturbance can lead to overstocking.

Soils on the flat to gently rolling terrain of the Cottonwood Creek valley floor are a complex of deep glacial outwash, glacial till and alluvium with occasional potholes and wetlands. Dominant soils (35% of harvest area) on the forested areas in the proposed harvest units are Rumblecreek, Totelake and Perma gravelly loams on 4-30 slopes. These are moderate productivity soils that support mixed species of Douglas-fir, lodgepole pine and Ponderosa pine. These similar soils typically have a gravelly loam surface over deep gravelly and stony clay loam subsoils. There is also a Rumble Creek/ Water complex map unit that includes some potholes and wetlands where the water table rises in the spring and potholes and low spots may fill with spring waters before subsiding in July. These soils are subject to rutting and compaction if operated on in the spring when wet. This limitation can be overcome by limiting operations to dry summer periods or winter conditions. Erosion risk is low on these gentle slopes.

Other included and minor soils are mapping units with slopes of 30- 60%, that affects less than 3% of the project area (refer to project file). These soils are mainly complexes of deep gravelly loams and silt loams, with some areas of clay rich subsoils. These groups of soils are moderate productivity and support Douglas-fir, lodgepole pine and ponderosa pine and western larch. Erosion risk is moderate on slopes less than 45% and the terrain is well suited to ground based operations on slopes up to 45%. Steeper slopes over 45% have high displacement and erosion risks that can be overcome by cable logging or winch line skidding.

The existing DNRC forest access road cross segments of clay rich soils that will limit access during spring thaw up to approximately mid-June. Season of use is limited to relatively dry summer/fall months or frozen ground on included areas of clay-rich soils.

Previous Harvest Effects on Soil Resources

Previous harvest has occurred historically at varied levels in all sections with most recent harvest in the 1980's and some historic selection harvest (hand fell/crosscut) occurred over 80 years ago.

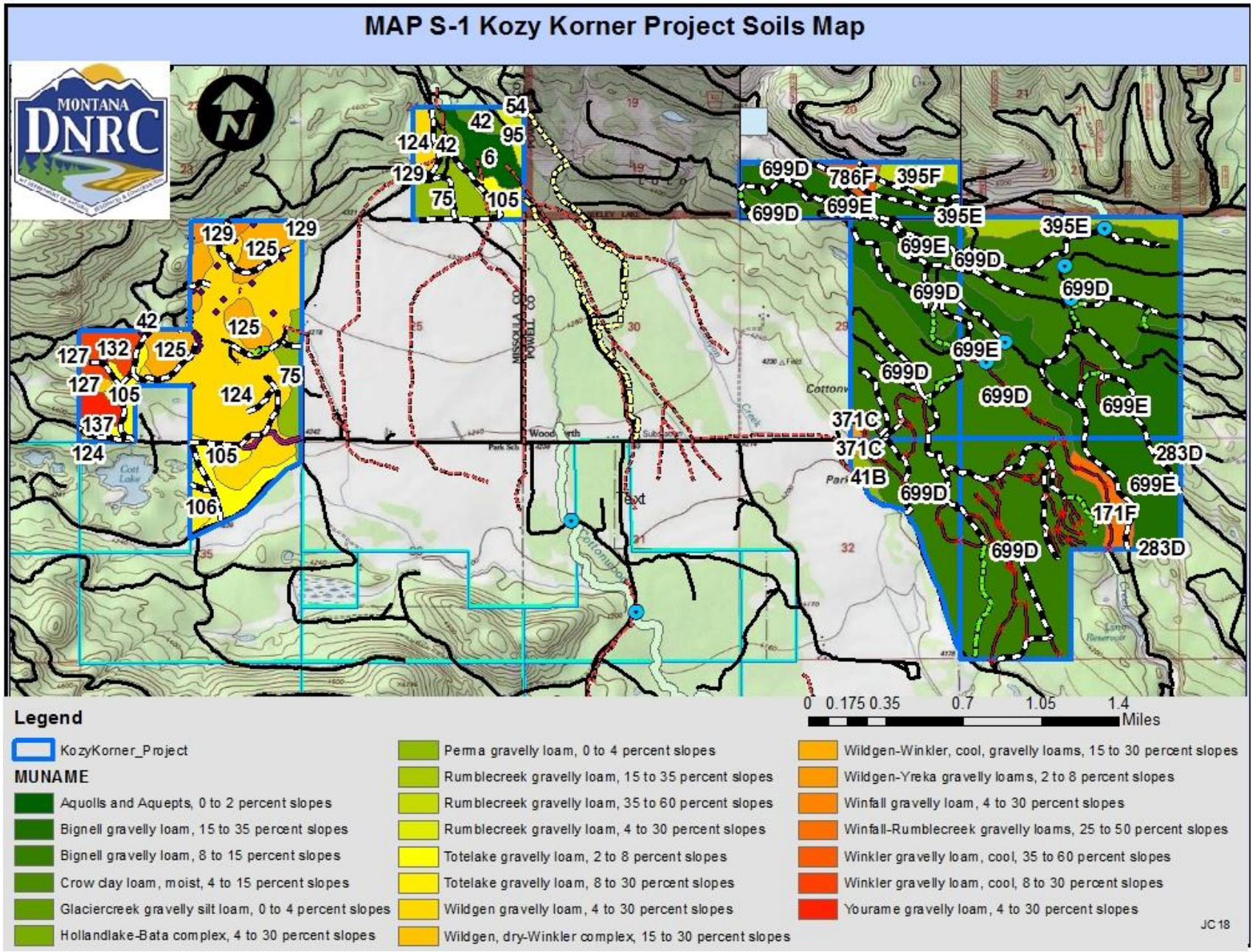
Historic harvest effects have largely recovered with forest vegetation and trees established in secondary trails. A few major skid trails and landing sites are still apparent and harvest effects are estimated to be less than 10% of the proposed harvest units. Field assessment found that the previous soil effects have ameliorated in the last 25 years and the parcels are well regenerated to conifers and minor erosion problems were noted. There are apparent growth reductions still on some of the old landing sites that would likely be used again.

During the Rice Ridge Fire in 2017, roughly 80 acres of state lands was burned in section 20 T16N, R14W above the Cottonwood Lakes road and in no other portion of the proposed state project lands. A salvage permit to harvest within a 60-acre area was analyzed for in 11/2017 under the Black Canyon Salvage Environmental Assessment. The only surface water feature in the salvage area is a short reach of intermittent stream that goes subsurface shortly below the Cottonwood Lakes 477 Road and does not deliver to downslope surface water resources outside the project site. The burned area on the state parcel was a mosaic of low to moderate burn severity with some localized spots of high burn severity.

We expect higher levels of erosion in fire areas mainly in localized areas of high burn severity that would be consistent with post wildfire conditions as noted in the soils section. In the 60 acres that burned on the state parcel, we do not expect concentrated flow would impact downslope water quality on this dry site where there is no stream connectivity. The permit harvest would use existing roads that were recently maintained following the Rice Ridge Fire, and road drainage meets all Best Management Practices.

Nutrient Cycling & Soil Productivity

There are moderate to high levels of existing downed course woody debris across the proposed harvest areas that is representative of woody debris levels on similar vegetation types measured by Graham et al. (1994). Root rot pockets may be a partial result of increased vegetative stress on droughty sites and shallow soils (Filip 1989), or on areas of partial thinning where high stocking levels of Douglas-fir are retained. Infection is more frequent on poor sites with low moisture, and poor fertility than on good sites. Retaining vegetative litter and woody debris helps to control erosion on disturbed sites, provides media for healthy soil fungi, acts as mulch for water retention and conservation of soil nutrients important to tree growth. It is desirable to maintain moderate levels of litter and old and new coarse woody debris (>3" dia.) at ~10-15 tons/acre on the harvest units. Retention of well distributed forest cover provides protection from high solar insolation and can help reduce drought stress to improve conifer regeneration.


MAP S-1 Kozy Korner Project Soils Map
MONTANA DNRC
N
MISSOULA CO
POWELL CO
Cottonwood Creek
Woodworth
Park Sch
Cott Lake
0 0.175 0.35 0.7 1.05 1.4
Miles
Legend
KozyKorner_Project
MUNAME
Aquolls and Aquepts, 0 to 2 percent slopes
Bignell gravelly loam, 15 to 35 percent slopes
Bignell gravelly loam, 8 to 15 percent slopes
Crow clay loam, moist, 4 to 15 percent slopes
Glaciercreek gravelly silt loam, 0 to 4 percent slopes
Hollandlake-Bata complex, 4 to 30 percent slopes
Perma gravelly loam, 0 to 4 percent slopes
Rumblecreek gravelly loam, 15 to 35 percent slopes
Rumblecreek gravelly loam, 35 to 60 percent slopes
Rumblecreek gravelly loam, 4 to 30 percent slopes
Totelake gravelly loam, 2 to 8 percent slopes
Totelake gravelly loam, 8 to 30 percent slopes
Wildgen gravelly loam, 4 to 30 percent slopes
Wildgen, dry-Winkler complex, 15 to 30 percent slopes
Wildgen-Winkler, cool, gravelly loams, 15 to 30 percent slopes
Wildgen-Yreka gravelly loams, 2 to 8 percent slopes
Winfall gravelly loam, 4 to 30 percent slopes
Winfall-Rumblecreek gravelly loams, 25 to 50 percent slopes
Winkler gravelly loam, cool, 35 to 60 percent slopes
Winkler gravelly loam, cool, 8 to 30 percent slopes
Yourame gravelly loam, 4 to 30 percent slopes
JC18

Environmental Effects on Soils

No Action Alternative: Direct, Indirect, and Cumulative Effects

Implementation of the no-action alternative would result in no soil resource impacts in the project area. Soil resource conditions would remain similar to those described in the existing conditions of this analysis as displayed in Table S-2.

Table S-2- Summary of Soil Impacts by Alternative

Soil Disturbance and Productivity	Impact								Can Impact Be Mitigated?	Comment Number
	Direct & Indirect				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High		
No-Action										
Physical Disturbance (Compaction and Displacement)		**X**				**X**				
Erosion		**X**				**X**				
Nutrient Cycling	**X**				**X**					
Slope Stability		**X**				**X**				
Soil Productivity		**X**				**X**				
Action										
Physical Disturbance (Compaction and Displacement)		**X**	**X**			**X**			**Yes**	
Erosion		**X**				**X**			**Yes**	
Nutrient Cycling			**X**			**X**			**Yes**	
Slope Stability			**X**			**X**			**Yes**	
Soil Productivity			**X**			**X**			**Yes**	

Action Alternative: Direct and Indirect Effects on Soils

The proposed action selection and shelterwood harvest would occur on up to 1,630 acres of State land on the project parcels outlined on Watershed Map WS-1 using ground-based equipment. The proposed harvests and thinning operations are designed and would be administered to minimize soil disturbance and erosion while achieving silvicultural needs. All skid trails and landing would have adequate drainage/stabilization for skid trails that would control erosion.

Pre-commercial thinning is proposed to overlap the proposed harvest units and the thinning would be completed in combination with harvest activities on forest sites that are overstocked with young conifers. The thinning would be completed by equipment or hand crews in combination with harvest activities and would retain well stocked forest sites. The proposed thinning is expected to have

negligible and likely not measurable impacts to water resources and water quality. Tree planting to ensure stocking of preferred species, grass seeding roads for erosion control and noxious weed management would also occur.

Streamside Management Zones (SMZ) vary from 50 to 100 feet in buffer width in the project area. SMZ's and WMZ's would be marked to maintain harvest buffers to surface waters. An RMZ of 100 feet buffer distance (based on the forest stand potential tree height) would be designated adjacent to selected perennial stream reaches. All wetlands will be protected by marking WMZ boundaries, maintaining adequate vegetation on perimeters and minimizing disturbance and no impacts are expected in wetlands where no operations occur.

The proposed project would construct 1.5 miles of new road including relocations, and complete repairs and maintenance on all haul roads to meet BMP's.

Primary soil concerns with harvest operations are potential for excessive surface disturbance and to a lesser degree, erosion. To maintain soil productivity, and promote conifer regeneration, BMP's and the listed mitigation measures would be implemented to minimize the area and degree of soil effects associated with harvest operations. Implementation of BMP's and the recommended mitigation measures, has been shown to effectively limit detrimental soil impacts to less than 15% of the harvest units based on DNRC soil monitoring on comparable sites (DNRC 2006, 2011) and recent harvest on nearby sites and the estimated area that may be detrimentally impacted is displayed in table S-3. On existing roads, road maintenance and site- specific road reconstruction requirements would be implemented to improve road drainage and control erosion. All new roads would be grass seeded with site adapted grass to speed revegetation and control erosion and weeds.

Table S3- Detrimental Soil Disturbance Resulting from the Action Alternative

	Total Area (Acres)	Disturbance Rate (%)	Estimated Impacted Area (Acres)
Tractor Harvest Units (including landings)	1,088	Up to 15%	163.2
Thinning Harvest Units (including landings)	542	Up to 6%	32.5
Roads (1.5 miles)	6	< 0.4 % of project	6
TOTALS	1,636		201.7 Average 12.3%

We expect that by protecting at least ~80% of a harvest area in non-detrimental soil impacts, soil properties important to soil productivity would be maintained, and the projected impacts are below that range. The estimates of existing impacts are approximately 5% and additional impacts from the proposed operations are expected to add up to average of 12% and not exceed 15% projected. Contract administration would monitor on-going operations to control soil disturbance to avoid excessive impacts and meet silvicultural goals to reduce competition. The improved tree spacing would improve growth of retained trees, due to reduced competition for soil moisture and nutrients, and promoting diverse species more tolerant of root rot, as discussed in the vegetation section because Douglas-fir leave trees would be increasingly at risk to mortality. Western larch and ponderosa pine are resistant (although not immune) to Armillaria ostoyae. For all these reasons, there would be moderate risk of direct and indirect effects to geology or soil resources as a result of the proposed action.

Nutrient Cycling & Soil Productivity

Considering nutrient cycling, the level of tree mortality has already caused many needles and fine litter to fall to the forest floor. A substantial proportion of plant available nutrients are retained in the forest floor duff and surface mineral soils, and forest duff and litter provide a mulching cover that retains surface moisture. A substantial portion of fine foliage that has not already fallen would be expected to break off during logging operations. The proposed harvest and slash treatment is expected to reduce 15 to 20% of the existing coarse and fine woody debris, based on the planned 50% canopy harvest and retaining a proportion of fine materials. On all proposed harvest areas, a portion of old and new course woody debris (CWD >3” dia.) at ~5-10 tons/acre and fine litter (similar to historic ranges) would be retained as noted in attached mitigations.

Cumulative Effects of the Action Alternative on Soil Productivity

Cumulative effects to soils can occur from repeated ground skidding entries into the harvest area and additional road construction, depending on the area included. Previous harvest effects principally occurred in the prior to 1990's and the past operations have largely recovered and revegetated overall impacts are estimated at less than 5% within proposed harvest units. The additional impacts from the proposed operations are expected to add up to average of 12 and not exceed 15% projected, which is similar to past monitored effects (2006 Collins) and observations on recent harvests on nearby state parcels.

There would be short to mid-term reductions in fine litter on high priority fuels reduction treatment zones near residences and open roads. Cumulatively over the rotation of the forest stands, the combination of fine litter and coarse woody debris would be expected to maintain surface organic matter that provides media for healthy soil fungi and conserves soil nutrients and moisture important to tree growth and supports long term productivity. Improved tree spacing will reduce competition for nutrients and soil moisture, enhance growth of retained trees, and promote regeneration of conifers as noted in the vegetation section. Based on these factors there is low potential for long term additive cumulative effects to soils with the proposed actions.

Soil Mitigations

The analysis and levels of effects to soil resources resulting from the Action Alternative are based on implementation of the following mitigation measures:

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented on the applicable parcels.

- Limit harvest equipment and hauling operations to periods when soils are relatively dry, (less than 20%), frozen, or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

- On tractor harvest units the logger and sale administrator will agree to a general skidding plan prior to equipment operations to limit trails to 15% or less of the harvest unit. Feller-bunchers may work on slopes up to 45% as long as displacement and turning is minimized to prevent excessive disturbance. Slopes over 45% would be cable harvested to reduce soil impacts and improve harvest efficiency.

- Whole tree skidding can reduce slash hazard, but also remove a portion of nutrients from growing sites. Target fine slash and woody debris levels are to retain 5-15 tons/acre well distributed on site while meeting the requirements of the slash law. On sites with lower basal area, retain large woody debris as feasible since it may not be possible to retain 5 tons/acre and

the emphasis will be on providing additional CWD in the future. Slash may be placed on main skid trails to protect soils and reduce erosion potential.

- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

- Roads that would no longer be used due to relocation would be stabilized from erosion and hydrologically restored to promote conifer growth by reclaiming the road surface. Reclaimed roads would have the surface ripped to 12 inches in depth, relief culverts removed and effectively drained with waterbars, the surface grass seeded, and slash applied.

- Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation. If cut-slope or fill-slope slumps occurred on new roads they would be stabilized to control erosion as part of the harvest project.

- Road use would be limited to dry or frozen ground conditions to reduce rutting and erosion. New road construction, including drainage features, should be completed in the fall prior to freeze-up. Road cutslopes are to be constructed at relatively stable angles as noted in contract Exhibit B. Check snow/frozen ground conditions prior to operations.

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Attachment D: Water Resources Analysis

Kozy-Korner Timber Sale – Water Resources Analysis

Analysis Prepared By: Jeff Collins, Hydrologist/Soil Scientist, DNRC

Introduction

The following analysis will describe the existing soil conditions and the anticipated effects to water resources within the Kozy-Korner project area. Direct, indirect, and cumulative effects to soil resources and noxious weeds of both the No-Action and Action alternatives will be analyzed.

Issues

The following issue statements were developed from internal scoping and public comments and include compliance with laws and rules regarding the effects of the proposed timber harvest and road systems to water resources.

Water Quality - There is a concern that the proposed action may cause impacts to water quality from sedimentation that may occur associated with timber management activities, road construction and road use.

Cumulative Watershed Effects- There is a concern that the proposed timber harvest may cause or contribute to cumulative watershed impacts that may result in increased water yields that may affect stream channel stability.

Regulatory Framework

The following rules, plans, and practices have guided this project's planning and would be implemented during project activities:

Montana Surface Water Quality Regulations

All the watershed areas listed in this project area are classified as B-1 in the Montana Surface Water Quality Standards. The water quality standards for protecting beneficial uses in B-1 classified watersheds are described in *ARM 17.30.623*. The B-1 classification is for multiple-use waters suitable for; domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, agricultural, and industrial uses. Other criteria for B-1 waters include; no increases are allowed above naturally occurring concentrations of sediment, which will prove detrimental to fish or

wildlife and a maximum 1-degree Fahrenheit increase above naturally occurring water temperature is allowed within the range of 32 to 66 degrees Fahrenheit. Naturally occurring includes conditions or materials present from runoff or percolation on developed land, where all reasonable land, soil, and water conservation practices have been applied. Reasonable conservation practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry BMP's through its Non-Point Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities. Stream temperatures are discussed in the fisheries section. DNRC provides further protection of water quality and sensitive fish through implementation of the SMZ Laws and Forest Management Rules.

Water Quality Limited Waterbodies and Beneficial Uses

A Total Maximum Daily Load (TMDL) analysis was completed by MT DEQ for the Middle Blackfoot watershed that includes the watersheds of this Kozy-Korner Project area. The lower 10 miles of Cottonwood Creek (MT76F004_040) was listed as not fully supporting aquatic life by MT DEQ for 2016. The listed causes are sedimentation-siltation and probable sources are not identified, yet field evaluations noted channel edge impacts from grazing and sedimentation from roads. Cottonwood Creek surface flows are also affected by irrigation diversions. All beneficial other uses are considered supported. Shanley Creek and Dry Cottonwood Creek are not listed as impaired.

A TMDL (Total Max. Daily Load) for sedimentation and siltation was approved in 2008. A Basin-Wide Restoration Action Plan for the Blackfoot Basin was completed in 2005 by the Blackfoot Challenge and DFWP to list mitigations and establish restoration priorities. Numerous projects have been completed to improve water quality and the trend is improving.

Beneficial Uses-The downslope beneficial uses in the project area include: domestic surface water rights, recreation, cold-water fisheries, agriculture, irrigation, wildlife and livestock watering.

Water Rights- There are numerous water rights on the state project parcels, principally for direct livestock watering and irrigation diversions for downstream private ownership point of use. Water right holders include the state trusts, Fish Wildlife and Parks, the Nature Conservancy and other private downstream landowners. There are extensive water rights for private drinking water, agriculture irrigation and livestock watering in the analysis areas. Dry Cottonwood Creek has reduced seasonal flows from Lynn Reservoir that is upstream of Shanley Creek.

Montana Streamside Management Zone (SMZ) Law

All rules and regulations pertaining to the SMZ Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35%. An SMZ width of 50 feet is required when the slope is less than 35%(*ARM 36.11.427(3) (a) (i)* and *(IV)* and *ARM 36.11.436)*.

DNRC Forest Management Rules and DNRC Habitat Conservation Plan (HCP)

All applicable State Forest Land Management rules and regulations regarding watershed and fisheries management will be followed. This includes, but is not limited to, rules listed for water quality (*ARM*

36.11.422), cumulative effects (*ARM 36.11.423*) RMZ's (*ARM 36.11.425*), Fisheries (*ARM 36.11.427*) and Conservation Strategies outlined in the DNRC Habitat Conservation Plan (HCP 2011). As part of *ARM 36.11.427(3)(a)(i)* and *(iv)* and *ARM 36.11.436*, DNRC is committed to designing forest management activities to protect and maintain bull trout, westslope cutthroat trout and all other sensitive fish and aquatic species as noted in the fisheries assessment. Cottonwood Creek is a bull trout fishery. Shanley Creek and Dry Cottonwood Creek are westslope cutthroat trout fisheries. DNRC would protect Class 1 fisheries streams by designating Riparian Management Zones (RMZ's) based on stand potential tree height at 100 years in age and no-harvest buffers of 50 feet on fishery streams as noted in the mitigations. DNRC would protect wetlands by designating Wetland Management Zones (WMZ's) with appropriate protection boundaries.

Analysis Methods & Analysis Areas

The primary issues relating to water resources within the analysis area are potential impacts to water quality from existing and potential sediment sources and potential increases in water yield that may affect channel stability. A watershed analysis and field survey was completed by a DNRC hydrologist for the proposed sale area to determine direct, indirect and cumulative effects to water quality. The water quality evaluation included a review of existing inventories for water resources (NRIS 2017), the 2005 Upper Blackfoot Restoration Plan (BFC 2005) and reference to previous DNRC projects. Aerial photos of the project area were compared and combined with GIS analysis to estimate the area of past timber harvest and vegetative recovery. The water resources analysis included a course filter cumulative watershed effects analysis for the project area. Field reviews were completed for the proposed harvest units, access roads and associated streams. Then the observations, information and data were integrated into the watershed analysis and design of project mitigations. Descriptions of anticipated adverse impacts or positive impacts to water resources will be described, using information on impact extent and duration. The water resource analysis for water quality, water yield and cumulative effects considered the watershed areas and focused on the project stream reaches within the state parcels of the Cottonwood Creek and Shanley Creek drainages that are south and downslope of the Lolo National Forest lands.

Sediment Delivery

The analysis areas for sediment delivery are limited to the harvest units and roads used for hauling and will focus on the streams described as affected watersheds. Refer to the Hydrology Map WS-1 for analysis areas that encompass the proposed harvest units and road haul routes. A road inventory was completed for sediment sources and to design sediment control mitigation measures. The analysis includes in-channel and upland sources of sediment that could result from this project. In-channel areas include the stream channels adjacent to and directly downstream of harvest areas. Upland sources include harvest units and roads that may contribute sediment delivery associated with this project. The measurement criteria for this sediment analysis are**:**

1) miles of new road construction and road improvements compared to road density and

2) the potential for sediment delivery to streams and impacts to water quality.

Water Yield

Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of past, current or foreseeable future disturbances, both natural (fire) and human-caused. Past, current, and future planned activities have been considered for the cumulative effects analysis.

The analysis for cumulative effects to water yield considers the area of harvest units and access roads within the project drainages described as the affected watersheds. A DNRC hydrologist completed a coarse filter qualitative assessment of watershed conditions and cumulative effects as outlined in the Forest Management Rules (*ARM 36.11.423*) and the commitments described in the HCP concerning watershed management. Based on past logging and roads in the area, a more detailed assessment of sediment sources and stream channel conditions was also completed. The measurement criteria for the water yield analysis are the potential for increases to surface runoff water yield. Effects to stream flow will be described qualitatively considering the distribution and timing of peak flows.

Affected Watersheds

The proposed timber harvest and forest management project is located about within 10 air miles northwest of the town of Ovando. This project is within the Cottonwood Creek and Shanley Creek (that includes Dry Cottonwood Creek) affected watersheds, which were designated to evaluate the existing and predicted impacts to water resources associated with the proposed actions. Refer to watershed map WS-1 for the location of the project within the project watershed and refer to detail map WS-2 for the haul routes and proposed harvest and thinning treatments that would occur within portions of the following State trust parcels: **Sections: 20, 28, 29, 32 & 33, T16N R13W. Sections: 24, 26 & 35, T16N R14W.**

The Cottonwood Creek drainage (HUC 170102030909,) is over 15 miles long, 35,885 acres in area and includes the tributary streams: North Fork Cottonwood Creek, Spring Creek, Black Canyon Creek and Sharp Creek (local name). Precipitation is an average of 36inches/year and ranges from 14inches/year at the confluence with the Blackfoot River, to 60inches/year near the crest of Morrell Mountain, with precipitation is mainly received as snow. State parcels of sections 20, 24, 28, 29, and 33 delineate the project area, in the eastern portion of the project area and are divided by the Cottonwood Creek drainage to the west and Shanley Creek drainage to the east. The project parcels include 1,392 acres of state land in the foothills and valley of the Cottonwood watershed where average precipitation is 27inches/year.

The main stem of Cottonwood Creek flows through the 160-acre project parcel that is southeast ¼ of section 24, T16N, R13W. Proposed harvest effects were also evaluated for the partial state ownership within Sections 26 and 35 T14N, R16W that comprise roughly 500 acres of the project area.

The Shanley Creek drainage (HUC 170102030909,) drainage is 8,884 acres in area and is a perennial Class 1 tributary to Cottonwood Creek. The proposed harvest areas within the Shanley Creek include areas adjacent to tributary streams Dry Cottonwood Creek and Lost Creek. Precipitation is averages of 35inches/year, and ranges from 21inches/year near the confluence with Cottonwood Creek to 35inches/year in the headwaters of Shanley Creek, and is mainly received as snow. The proposed harvest areas are wholly within sub-tributary drainages of Dry Cottonwood Creek and Lost Creek. Lower Shanley Creek stream flows are largely diverted to irrigation ditches and the Bandy Reservoir.

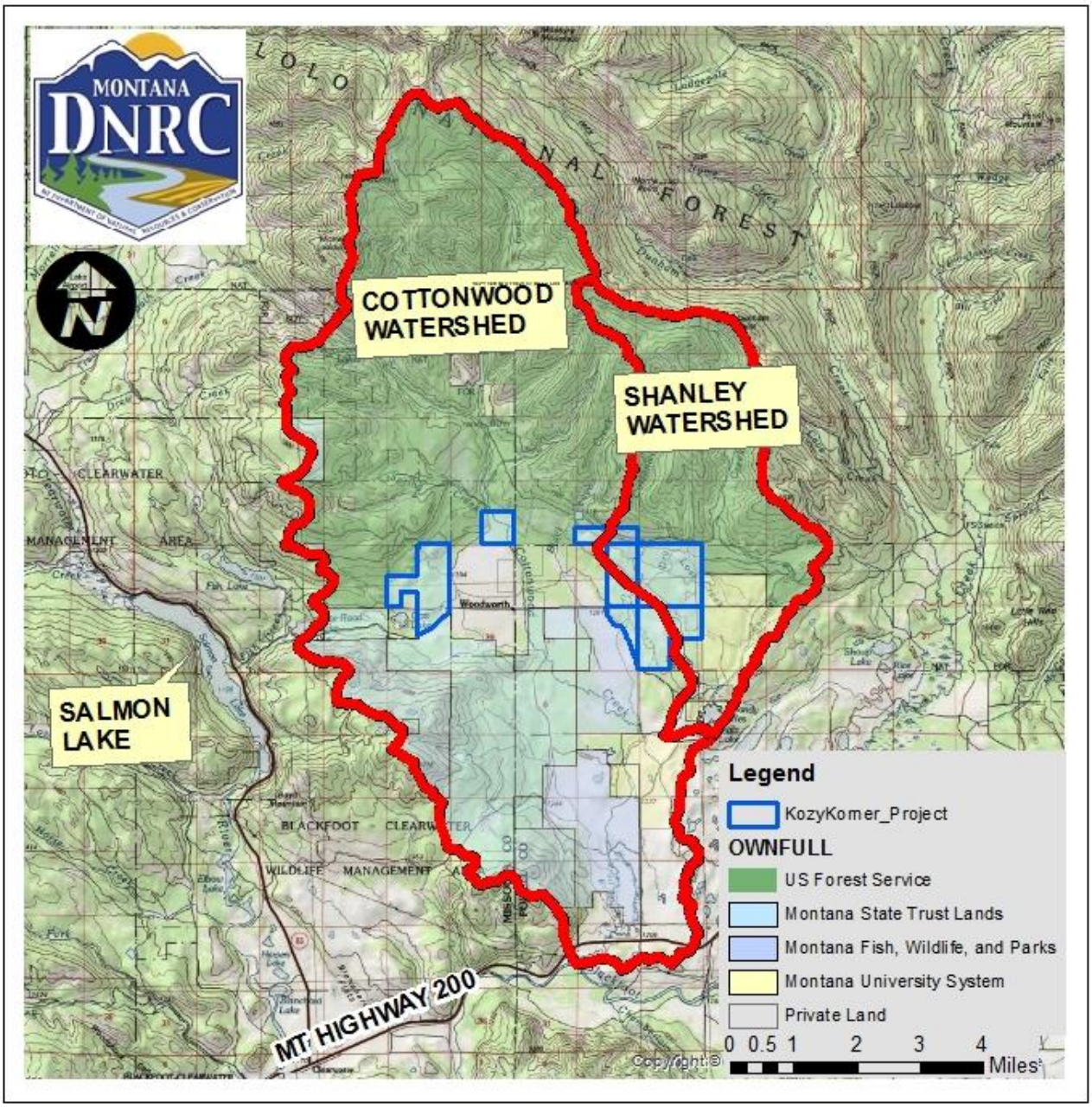
Dry Cottonwood Creek is a Class 1 tributary to Shanley Creek through the T16N R14W sections 28 and 33, , parcels. Average precipitation is 27inches/ year for the project sites. Precipitation ranges from 21inches/year at Shanley Creek to about 33inches/year in the headwaters. Dry Cottonwood Creek flows are intercepted by Lynn Reservoir and the stream is intermittent from the reservoir to the confluence with Shanley Creek. The Lost Creek tributary to Shanley Creek is also intermittent.

Analysis areas for watershed cumulative effects include the watersheds surrounding DNRC project sections and the access roads to those sections. Past, current, and future planned activities within each analysis area have been considered for the cumulative effects analysis. The proportions of ownership within each project watershed are displayed in table WS-1. Timber harvest and thinning are proposed on 978 acres (2.7%) of the Cottonwood Creek and 652 acres (7.3%) of the Shanley Creek watersheds.

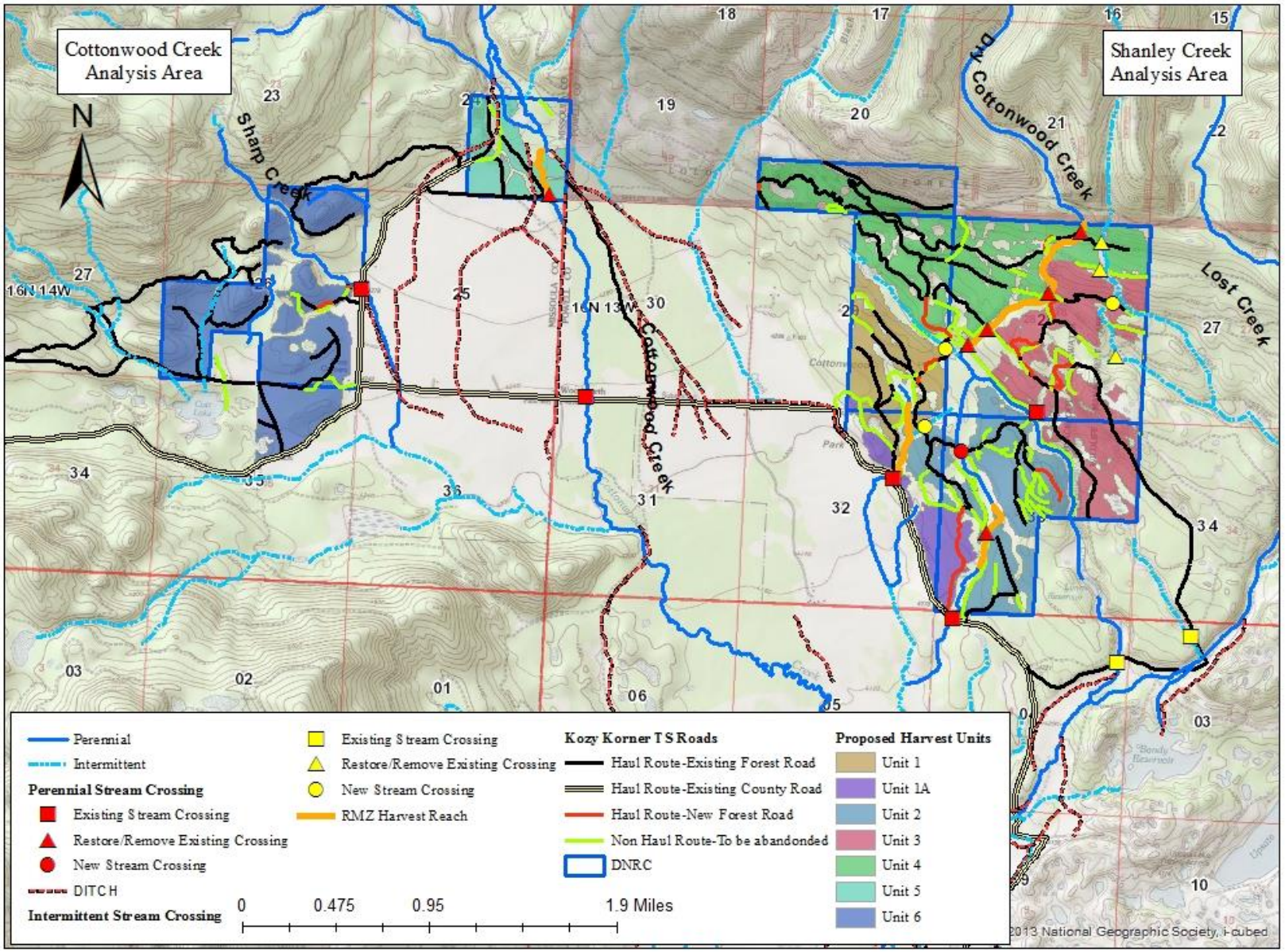
Table WS-1: Land Ownership Within the Kozy Korner Water Resources Analysis Area

	Cottonwood Creek Watershed		Shanley Creek Watershed	
	Acres	% of Watershed	Acres	% of Watershed
US Forest Service & BLM	13,366	37.3%	6,135	69.0%
Private Lands & Conservancies	9,860	27.4%	436	4.9%
Montana State Trust Lands	6,730	18.8%	1,036	16.9%
Montana Fish, Wildlife, and Parks	5,071	14.1%	0	0.0%
Montana University System	859	2.4%	1,278	14.3%
Total	35,886	100%	8,885	100%

MAP WS-1 KOZY KORNER PROJECT WATERSHED



Map WS-2 Kozy Korner Project Water Resources Analysis Map



Existing Conditions

Existing Conditions - Water Quality and Sediment Delivery

Past management activities in the proposed project area include timber harvest, grazing, road construction, rural development, fire suppression and recreation. The project area is dominated by mixed conifer forest that were largely shaped by wildfire. Portions of the northeast project area were previously private and corporate timberlands. Historic timber harvest occurred starting in the early 1900's by railroad, and was extensive from 1960 to 2005. Some impacts likely occurred on adjacent ownerships associated with logging and road use prior to the adoption of BMP's in 1988. Previous harvest in all sections that ranged from firewood, thinning, and even-age harvest. DNRC timber harvest projects in the general area during the last 15 years include: Good Shepherd EA (Good Time, Game Time, Game Over Timber Sales), Clearview EA, Hang on Shoupy EA, Ride the Pine EA, and minor salvage permits. Programmatic and State-wide BMP audits were completed on the Ride the Pine Timber Sale to monitor administration and mitigations, and operations were found to be in compliance with all SMZ rules. With the exception of for one site with inadequate road surface drainage that was not a direct sediment source BMP's were met during this assessment. Many road and water quality improvements were made during previous timber sales.

Sedimentation sources identified in the area are road-fill segments adjacent to stream channels, failed stream crossings and crossings with inadequate road surface drainage adjacent to crossing sites, historic riparian harvest, and dispersed grazing including wildlife use. Sediment inventories were completed for existing roads and crossing sites on haul routes within the project area. Streams within the project area were reviewed for channel stability and sediment sources.

The Rice Ridge Fire burned approximately 11,339 acres (32%) of the headwaters of Cottonwood Creek, burning as a mosaic of low to high burn severity. Approximately 5,458 acres (61%) of the headwaters of Shanley Creek burned as a mosaic of low to high burn severity. Following wildfires, increased runoff and peak flows are common and will cause varied levels of increased surface erosion, sedimentation, stream channel scour, and impacts to water quality. Increased runoff and peak discharge can also result in blocked or overwhelm undersized culverts and possible loss of crossings leading to further sedimentation. Rapid snow melt or rainfall events can increase impacts to channel scour and would be more likely in areas of moderate to high burn severity. Following the Rice Ridge Fire, the Lolo N.F. completed fire suppression repairs including road grading, culvert cleaning, and dozer line stabilization of sites disturbed by fire suppression efforts. A Burned Area Emergency Response (BAER) team completed an assessment of the extent and degree of fire effects on resources.

The BAER team completed evaluations and peak flow estimates to determine if crossing structures were adequately sized or at risk of flood damage within and downslope of the fire (Sylte et.al.2017). The team determined that there is a likely impairment of hydrologic functions of minor and intermediate risks, and that a watershed emergency does not exist. Specific crossings were identified in the headwaters of Cottonwood Creek and Shanley Creek that are at risk where flow capacities are less than modeled 25-year peak-flow runoff events. Recommendations were developed to reduce fire effects and impacts to water quality though the anticipated 3-5 years while ground vegetation recovers. The recommendations include upgrade or removal of under-sized crossings, restoring road surface and ditch drainage prior to crossing sites, site specific repairs and culvert maintenance, and post-storm patrols that are planned for the next 2 years.

During the Rice Ridge Fire, roughly 80 acres of state lands was burned in section 20 T16N, R14W above the Cottonwood Lakes road and in no other portion of the proposed state project lands. A 60-acre salvage permit was analyzed for in November 2017 under the Black Canyon Salvage Environmental Assessment. The only surface water feature in the salvage area is a short reach of intermittent stream that goes subsurface shortly below the Cottonwood Lakes road 477and does not deliver to downslope surface water resources outside the project site. The burned area on state land was a mosaic of low to moderate burn severity with some localized spots of high burn severity.

We expect higher levels of erosion in fire areas mainly in localized areas of high burn severity that would be consistent with post wildfire conditions as noted in the soils section. In the 60 acres that burned on state land, we do not expect concentrated flow would impact downslope water quality on this dry site where there is no stream connectivity. The permit harvest would use existing roads that were recently maintained following the Rice Ridge Fire, and road drainage meets all BMP's.

Cottonwood Creek Analysis Area

Cottonwood Creek valley is formed of alluvium, glacial outwash, and glacial till deposits with common pothole ponds and broad wetlands. Tertiary age mudstones and siltstones outcrop as small hills and underlie portions of the Ovando valley. The finer textured glacial till and localized tertiary mudstone deposits are the most erosive.

This analysis will focus on the proposed timber harvest project that is located on the valley floor and footslopes in Cottonwood Creek drainage south of Cottonwood Lakes road 477.

There are dispersed sediments from open county roads and restricted access roads on state parcels where roads are adjacent to streams. In a general framework, potential sediment risk increases with increasing density of the road network (mi/sq. mi), the extent of roads near streams, and number of stream crossings.

The proposed project State trust lands have a lower average road density of roads/square mile than on combined land ownerships, yet still have sedimentation concerns due to the extent of roads within 300 feet of streams and identified legacy poor crossing sites (Table WS-2).

Table WS-2: Project Comparison of Road Densities by Watershed Analysis Area.

	Watershed	
	Cottonwood Creek	**Shanley Creek**
Watershed Area (sq. mi)	21.9	15.1
Watershed Road Miles	231.0	67.0
Watershed Road Density (mi/sq. mi)	5.8	4.4
Project Area Road Miles	25.3	14.6
Project Area Road Density (mi/sq. mi)	3.1	2.7
County Roads in Project Area	12.5	0.1
Project Roads within 300 ft. of Class 1 stream	4.0	2.2
Existing Stream Crossings-Project Haul Roads	8	9

Within the Cottonwood Creek project area, several direct sediment sources were located on the proposed haul routes, principally at culvert locations as noted on map WS-2. Most of the main County access roads meet BMP's except for 3

stream crossings identified during field reviews. Secondary forest roads on state parcels include steep segments that do not meet BMP's for adequate surface drainage. Project level road inventory found roughly 4.0 miles of state forest road segments within 300 feet of intermittent and perennial streams that have a higher potential for sediment delivery. Most of the existing roads are well vegetated and surface erosion is low-moderate except near stream crossing sites.. Past riparian harvest caused streambank disturbances that have largely revegetated.

Mainstem Cottonwood Creek flows through the 160-acre state parcel of Section 24 T13N, R16W and supports bull trout. An old ford crossing site in SE ¼ section 24 on Cottonwood Creek has widened banks and is a direct sediment source, but is not open to use. Within the Cottonwood Creek analysis area, the ford site on state section 24 may be at risk from upstream flows associated with Rice Ridge fire effects. State project parcels in Sections 26 and35, T16N, R15W are drained by Sharp Creek and several intermittent streams. Sharp Creek is a perennial stream with stable banks and minor prior disturbances through state section 26. On the eastern state boundary Sharp Creek is crossed by the Cottonwood Lakes road and becomes intermittent prior to the confluence with Cottonwood Creek. The SE ¼ of Section 26 parcel is drained by an unnamed perennial stream intermittent channel that flows toward but does not connect with Cott Lake. The forest access roads to Section 26, T16N R15W are in good condition yet segments of the secondary forest access roads do not have adequate road surface drainage to meet BMP's.

Within the Cottonwood Creek analysis area, livestock grazing occurs on roughly 640 acres. There are also considerable elk use associated with the game range. Grazing impacts are light to moderate in this analysis area, with over-widened streams noted at several crossings, and some streambank disturbance and removal of riparian vegetation.

Shanley Creek Analysis Area

Within the Shanley Creek drainage, 3 failed log crossing sites and 1 undersized culvert are chronic sediment sources on Dry Cottonwood Creek.and Project level road inventory found roughly 2.2 miles of state forest road segments within 300 feet of intermittent and perennial streams that have a higher potential for sediment delivery. Most of the existing roads are well vegetated and surface erosion is low-moderate except near stream crossing sites. Site reviews noted 3 additional stream crossing sites that are sediment sources principally on old legacy roads of poor design. Past riparian harvest caused streambank disturbances that have largely revegetated.

Within the Shanley Creek analysis area, grazing impacts are light, and have less effect on channel form than the Cottonwood Creek analysis area, with some streambank disturbance and removal of riparian vegetation, likely from wildlife as there are no current grazing licenses on these parcels.

Water Yield

Tree canopy reduction by timber harvest activities, wildfire, or tree mortality can affect the timing of runoff, increase peak flows, and increase the total annual water yield of a specific drainage. Effects are principally observed in areas with an average of 30 inches or more of annual precipitation. Moderate to high increases in water yield can increase stream channel scour and in-stream sediments that impact water quality and fish habitat, so we assess stream channel conditions as part of the project analysis. Water yield can also decline based on forest canopy regrowth that increases precipitation interception and transpiration, which reduces runoff. Paired watershed studies in snow dominated areas of Wyoming and Colorado indicate that in a drainage with a mean annual precipitation of 30 inches, a removal of 100% of forest canopy would result in an approximate 8-inch (about 90%) increase in water yield. By comparison an area with 21 inches mean annual precipitation with 100% canopy removal would only have a 1 inch, or an 18%, increase in water

yield. Yet, in low annual precipitation zones (16-20 inches/ year) there is unlikely to be a statistically measurable change in water yield even from extensive canopy removal (Romme et. al.2006).

In the proposed harvest areas, average yearly precipitation is 27inches/year. Snowmelt in the project areas typically occurs early spring in April and prior to peak runoff in May from snowmelt in the upper basins of Cottonwood Creek and Shanley Creek. The majority of the proposed project is located on the footslopes and lower valley area that has lower runoff. Currently, lodgepole and ponderosa pine that are dead, dying, or at risk of mountain pine beetle mortality comprise less than 10% of overall stand volume in proposed harvest areas. Pine mortality and loss from snow damage is greater in the northeast corner of the project area, which, in addition to insect mortality, may have resulted in a minor increase in available water. This increase is very unlikely to be a measurable increase the surface runoff or water yield and would be within the range of natural conditions expected. Historically tree cover comprised about 75-80% of forest stands in combination with natural openings and areas in various successional stages after fires, as noted in the vegetation section description and as described by Losenski (1997) for this climatic section 332B.

As noted in the Rice Ridge fire effects discussion, increased water yield is expected in the headwaters of Cottonwood Creek and Shanley Creek drainages that potentially will increase channel scour. Channel stability has been affected by historic riparian harvest and relict road-stream crossing sites. Over the years, vegetative recovery has led to an improving trend in overall stream channel stability, except for segments of degraded channel at the identified failed crossing sites. Overall stream channel stability is good through the DNRC parcels in part due to vegetative recovery on channel banks and the fact that past harvests occurred over 25 years ago. Stream channel stability is rated as good for most project streams.

Stream flows in Cottonwood Creek and Sharp Creek are subject to water losses from natural dewatering in the coarse alluvium and outwash of the Cottonwood Creek valley floor as well as irrigation diversions. The lower reaches of Cottonwood Creek, Shanley Creek and Dry Cottonwood Creek have experienced 30-50% reduced water flow and dewatering from irrigation and water loss from diversions (BFC 2005). Several cooperative projects including head-gates and ditch improvements have been implemented In the Cottonwood Creek and Shanley Creek drainages to increase in-stream flow and reduce irrigation ditch water losses, yet diverted flows and water losses continue to have a substantial effect on summer flows.

On the eastern state boundary in section 26, T16N, R15W, Sharp Creek is crossed by the Cottonwood Lakes road and becomes intermittent prior to the confluence with Cottonwood Creek. Reduced flows are largely due to dewatering by irrigation diversions and infiltration loss downstream. The southwest corner of section 26, & 35, T16N, R15W are drained by intermittent streams that do not deliver to Cottonwood Creek and are partially diverted.

Historic ditch diversions occur on 3 sites of the 160-acre Cottonwood Creek section 24, T16N R14W that are ditched to downstream private lands and reduce flows in the mainstem of Cottonwood Creek. Two of the ditches deliver water to another body of water and are considered Class 3 streams for harvest protection purposes.

Impacts to lower Shanley Creek are expected to be partially moderated by water retention in Bandy Reservoir and Lynn Reservoir. Dry Cottonwood Creek flows downstream to a private pond named Lynn Reservoir in SW ¼ section 33, T14N R15W. Most sediments from Dry Cottonwood Creek are captured and settle out in the reservoir. Flow below the reservoir is intermittent in most years. Lost Creek is an intermittent stream that flows through the northeast corner of section 28, T 16N, R14W then easterly to Shanley Creek above Bandy Reservoir. Overall there is low to moderate effects

on water yield with expected spring pulses of increased runoff on burned areas of upper watersheds and continued loss of in stream flows on the lower valley sites from irrigation diversions and losses to coarse textured soils.

Environmental Effects on Water Quality

Direct and Indirect Effects of the No- Action Alternative on Water Quality and Quantity

No direct or indirect effects to water quality or quantity would be expected to occur other than those described under existing conditions. Direct and indirect effects of the proposed action are summarized in Table WS-3. Sedimentation on segments of existing roads with inadequate surface drainage would continue to impact water quality unless remedial actions are taken.

Continued insect mortality or extreme wildfire may increase runoff and water yield relative to increasing canopy loss. There are low to moderate direct and indirect effects to water yield due to upstream wildfire effects and past harvests, yet recent harvest stands in the proposed harvest areas have regenerated and begun hydrologic recovery, with many stands overstocked.

Table WS-3: Summary effects of the No-Action and Action Alternatives on Water Quality and Quantity.

		Impact											
		Direct				Indirect				Cumulative			
Alternative		No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High
No-Action	Water Quality			X				X			X		
	Water Quantity		X	X			X	X			X	X	
Action	Water Quality			X				X			X		
	Water Quantity		X	X			X	X			X	X	

Direct and Indirect Effects of the Action Alternative on Water Quality and Quantity

Land management activities such as timber harvest and road construction could impact water quality primarily by accelerating sediment delivery to local stream channels. The primary risk to water quality is sediment delivery at stream crossings. Potential change in water yield is further addressed under cumulative effects. Implementation of the action alternative is mainly moderate intensity harvest of trees that are overstocked, dead, or in poor condition, and selection harvest of live trees to reduce competition and improve growth of diverse tree species. Under the proposed action, selection and shelterwood harvest would occur on up to 1,630 acres of State land on the project parcels outlined on Watershed Map WS-1 using ground-based equipment. Proposed harvest and thinning operations are designed, and would be administered, to minimize soil disturbance and erosion while achieving silvicultural needs. All skid trails and landing would have adequate drainage/stabilization for skid trails that would control erosion.

Pre-commercial thinning is proposed to overlap the proposed harvest units and the thinning would be completed in combination with harvest activities on forest sites that are overstocked with young conifers. Thinning would be

completed by equipment or hand crews in combination with harvest activities and would retain well stocked forest sites. Proposed thinning is expected to have negligible and likely not measurable impacts to water resources and water quality. Tree planting to ensure stocking of preferred species, grass seeding roads for erosion control and noxious weed management would also occur.

Streamside Management Zones (SMZ) vary from 50 to 100 feet in buffer width in the project area. SMZ's and WMZ's would be marked to maintain harvest buffers to surface waters. An RMZ of 100 feet buffer distance (based on the forest stand potential tree height) would be designated adjacent to selected perennial stream reaches as noted on map WS-2. Cottonwood Creek in section 24 would have the RMZ designated in combination with a Channel Migration Zone to accommodate the braided nature of the channel and provide protection from disturbances or damages. No harvest is proposed in the first 50 feet of SMZ/RMZ adjacent to perennial class 1 fish bearing stream reaches. Riparian vegetation is well established and there is low potential for off-site erosion or sediment delivery based on comparable findings for no harvest within these buffer widths based on DNRC monitoring of similar treatments and research (Lakel et.al. 2010).

Sediments

Implementation of the Action Alternative would principally use existing haul roads and road drainage would be improved to comply with BMP's. Attached mitigations, State Forest Land Management rules and regulations, and measures outlined in the DNRC HCP would be implemented to protect water quality. The proposed project would construct/relocate 1.5 miles of road, and close/stabilize and abandon 12.5 miles of road that do not meet BMP's. The summary of changes in project road density and closures of roads within 300 feet of streams is noted in table WS-4. Based on implementing Best Management Practices, Streamside Management Zones, Riparian Management Zones and mitigations as outlined in the site inventory, there is low potential for off-site sediment delivery to streams or surface waters from the proposed management actions.

There are 15 road-stream crossing sites that fail to meet BMP's and are chronic sources of sedimentation. Three crossing sites would be replaced to improve flows and reduce sedimentation that are expected to aid in stabilization of channel conditions. Ten of the failed crossing sites would be removed/stabilized and the stream channel cross-sections restored to mimic natural conditions. Two additional sites will be improved prior to timber hauling and equipment use during the project.

Several intermittent stream crossings on the existing road would have substantial reductions in sediments from road surfaces as a result of maintenance and relocations that would reduce non-point sediments. One undersized culvert on Dry Cottonwood Creek in the northwest ¼ of section 28 has a stable road surface but has stream channel instability at the outlet. The least disturbance plan is to use the existing crossing with erosion control measures and then permanently remove the crossing and stabilize/restore the channel profile to improve water quality and fish passage.

Table WS-4: Comparison of road mileage in each analysis area following construction and abandonment of roads in each analysis area.

	Analysis Area	
	Cottonwood Creek	Shanley Creek

Project Area Roads (mi)	Existing*	12.8	14.6
	New Construction	0.9	1.5
	Abandoned/Closed	-7.3	-5.2
	Total Road Miles at End of Project	6.4	10.9
Project Area Roads Within 300 ft of Class 1 Stream (mi)	Existing	4.0	2.2
	New Construction	0.2	0.0
	Abandoned/Closed	-2.6	-1.9
	Total Road Miles at End of Project	1.6	0.3

*Does not include county roads in the project area

Removal and stabilization of failed crossing sites and the replacement of several culverts on streams would result in direct increases in sediment during de-construction, and when flows return to the stream channels. Associated sedimentation is expected to be low, short term and less than the current conditions with no-action. In summary, the proposed logging operations, road construction and numerous stream stabilization project sites are expected to have a moderate risk of direct and indirect impacts to water quality and a long-term net benefit to water quality by reducing legacy sediment sources based on implementing BMP's and Forest Management Rules.

Cumulative Watershed Effects of No-Action Alternative:

Under the no-action alternative, cumulative effects would remain the same as described in existing conditions. Wildfire effects in the headwaters of Cottonwood Creek and Shanley Creek drainages are expected to result in increased runoff and potential higher peak flows. Existing crossings that are undersized could be lost and legacy crossing sites that could be further destabilized by increased flows.

Increases in water yield and peak flow magnitude are expected as a result of the 2017 Rice Ridge Fire in the headwaters of Cottonwood Creek and Shanley Creek. The Lolo National Forest plans to complete limited fire salvage harvest and replace undersized road crossings to mitigate for increased stream flows.

Cumulative Watershed Effects of the Action Alternative:

There would be low additive risks of adverse cumulative impacts from the proposed action to water quality and beneficial uses based on implementation of BMP's and mitigation measures designed for timber harvest and road construction operations. Within the cumulative effects analysis area, DNRC has proposed a combination of shelterwood, selective harvest, and thinning of overstocked, dead, and dying trees in the project area.

There would be a minor amount of new road construction/relocations to improve the road system and a net decrease in roads on the state project parcels as noted in Table WS-4. The new road construction would be located away from surface waters and represent a low risk of impacts to water quality. The proposed crossing removals would result in a positive benefit to cumulative effects to water quality from reduced sediments and reduced roads.

The decrease in road density combined with improved road relocation with wide buffers to surface waters represents a low risk of impacts to water quality. Water quality would be improved adjacent to existing roads to meet BMP's where sediment concerns have been identified. Closure and stabilization of steep and poor road locations that do not meet BMP's would further reduce dispersed sediments to benefit water quality.

Water Yield

The proposed harvest and thinning would occur on up to 1,630 acres, which is well distributed over the drainage areas and are located on the footslopes and valley floor which receive moderate precipitation. Montana State Trust Lands represent about 18.8% of Cottonwood Creek watershed and the proposed project parcels are 1,392 acres and harvest and thinning are proposed on 978 acres or 2.7% of the watershed. Montana State Trust Lands represent about 16.9% of Shanley Creek watershed and the proposed project is located on 652 acres or 7.3% of the watershed. Water yields in the headwaters of Cottonwood Creek and Shanley Creek are expected to increase associated with the Rice Ridge Fire of 2017 and those effects would be expected to wane in 3-5 years in low to moderate burn sites and slowly recover as vegetation reestablishes in the more severe burn areas.

The proposed timber harvest treatments would retain 40–60% of tree cover and is not expected to cause a measurable additive effect to water yield compared to no-action based on the following reasons;

1) The project area is located on valley footslopes with moderate precipitation sites of 25–28 inch annual precipitation where evaporation and infiltration rates generally exceed precipitation rates.

2) The project areas include multi-story forest stands that are generally well regenerated and overstocked with young trees. The proposed moderate intensity, selective, and shelterwood harvests would remove stagnant trees and promote codominant and understory trees that use water more efficiently.

3) Removal of dead and dying trees is proposed on approximately 10–15% of the harvest area would not measurably contribute to interception or transpiration.

4) The proposed precommercial thinning would thin overstocked trees of up to 1,000 stems/acre to a spacing of 200–300 stems/acre. Thinning would also reduce competition and promote faster growth and improved water efficiency in the retained trees.

5) The harvest would retain 40–60% of tree cover and is not expected to cause measurable changes in water yield. The proposed harvest in Cottonwood Creek drainage would be estimated to increase water yield less than 1% and harvest in Shanley Creek drainage would be estimated to increase water yield less than 2%.

6) Any minor increase in water yield would likely be a benefit to downstream beneficial uses to offset existing losses to irrigation.

In summary; the proposed project has low potential for cumulative impacts to water quality or water yield due to implementation of BMP's, reduced road density, improved road drainage and sediment control projects, minor potential water yield increase or a potential change in stream channel forms or flow regimes.

Water Resources Mitigations

The analysis and levels of effects to Water resources with the Action Alternative are based on implementation of the following mitigation measures.

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan would be implemented on the applicable parcels.

- DNRC would locate, clearly mark and maintain suitable water resource protection boundaries including Streamside Management Zones (SMZ's), Riparian Management Zones (RMZ's), Channel Migration Zones (CMZ's) and Wetland Management Zones (WMZ's) adjacent to streams and wetlands consistent with State Forest Land Management rules, and the DNRC HCP where applicable.

- Streamside Management Zones vary from 50 to 100 feet in buffer width and would be marked. No harvest will occur within 50 feet of Class 1 perennial streams. A RMZ of 100 feet buffer distance (based on the forest stand potential tree height) would be designated along all Class 1 streams. A CMZ would be designated along segments of Cottonwood Creek in the southeast ¼ of Section 24, T16N, R14W. Selective harvest would occur in designated segments of RMZ from 50 to 100 feet from Class 1 stream segments. All segments of RMZ harvest would maintain at least 50% of merchantable trees >8 inches DBH.

- Limit harvest equipment and hauling operations to periods when soils are relatively dry (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

- Construct and maintain erosion control features on trails and roads where needed. For skid trails on slopes, install waterbars or well distributed slash on trails as needed to control erosion potential and reduce potential unauthorized ATV use as needed.

- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP's, crossing design 124 permits and to protect water quality.

- The contract would require 3-day notification prior to stream restoration and fishery stream stabilization and improvements. A fisheries or water resources specialist would be available for on-site assistance with project administration and erosion control.

- All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

- Roads that would no longer be used due to relocation would be stabilized from erosion and hydrologically restored to promote conifer growth, by removing culverts and installing effective road surface drainage with water-bars and the surface grass seeded as needed. Selected roads to be reclaimed would have the surface ripped to 12 inches in depth.

- Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation.

- Road use would be limited to dry or frozen ground conditions to reduce rutting and erosion. New road construction, including drainage features, should be completed in the fall prior to freeze-up. Road cutslopes are to be constructed at relatively stable angles as noted in contract Exhibit B. Check snow/frozen ground conditions prior to operations.

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Attachment E: Fisheries Resources

Kozy Korner Timber Sale- Fisheries Resources Assessment

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Introduction

The following assessment will disclose anticipated effects to fisheries resources within the Kozy Korner Timber Sale project area.

Issues

For the purposes of this environmental assessment, issues will be considered actual or perceived effects, risks, or hazards as a result of the proposed alternatives. Issues, in respect to this environmental assessment, are not specifically defined by either the Montana Environmental Policy Act or the Council on Environmental Quality.

The following issue statements were developed based on internal scoping and public comments received during the scoping period:

Fisheries Connectivity: Restrictions to fisheries connectivity were identified in Dry Cottonwood Creek, with an existing crossing structure preventing upstream movement by all life stages of westslope cutthroat trout. The structure should be replaced to provide fish passage.

Riparian Timber Harvest: There is a concern regarding the removal of large woody debris and snags from SMZs or wetlands and possible disturbance effects of timber harvest especially along Cottonwood Creek and a recommendation for no harvest in the SMZ. Reductions in riparian tree canopy may affect stream shading and subsequently stream temperatures.

Analysis Areas

Two fisheries analysis areas were identified to evaluate existing conditions and potential impacts to fisheries and fisheries habitat resources associated with the proposed actions. Analysis areas include the Cottonwood Creek (HUC12: 170102030909) and Shanley Creek (HUC12: 170102030908) watersheds (Map WS-1). Analysis areas were selected based on current and historic fish communities, and potential effects of the proposed actions including timber harvest, road

construction, and haul routes which have measurable or detectable impacts to fisheries populations or habitat resources in those areas.

Assessment Methods

Existing Conditions will be described for each analysis area included under the proposed action. *Environmental Effects* will compare the existing conditions to the anticipated effects of the No-Action Alternative and the Action Alternative to evaluate potential impacts to fisheries resources in the project area. The environmental analysis will focus primarily on fisheries populations and habitat variables affecting bull trout and westslope cutthroat trout, as these native species are the primary focus of conservation actions and related comments received during project scoping (internal and external). Additional species present, or presumed to be present in the project area are not listed under federal or state programs. Potential effects mechanisms that could impact non-native fish species present in the project area can be adequately addressed through analysis on the focal species. Analyses may be either qualitative or quantitative and will utilize the best available data for both fisheries populations and habitat resources.

The following variables will be used to evaluate potential environmental effects to fisheries resources in the project area.

- Fisheries Populations – Presence/Absence, Genetic Purity
- Fisheries Populations – Connectivity
- Fisheries Habitat – Channel Forms
    - Fisheries Habitat – Sediment
    - Fisheries Habitat – Flow Regimes
    - Fisheries Habitat – Woody Debris
- Fisheries Habitat – Stream Temperature
    - Fisheries Habitat – Stream Shading
- Fisheries Habitat – Cumulative Effects

Direct effects to fisheries populations are defined as those that would alter or impact species presence/absence or genetic purity. Indirect impacts on fisheries populations may include alterations to population connectivity through the addition or improvement of road-stream crossing structures.

The descriptions of foreseeable adverse impacts to fisheries resources are described in Table F1. Positive impacts to fisheries resources will also be described, if applicable, using information on impact extent and duration.

Cumulative impacts are those collective impacts on the human environment of the proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (75-1-220, MCA). The potential cumulative impacts to fisheries resources in the analysis areas are determined by assessing the collective anticipated direct and indirect impacts, other related existing actions, and future actions affecting the fisheries resources.

Table F1 – Descriptions of Foreseeable Adverse Impacts.

Impact Description	Probability of Impact	Severity of Impact	Duration of Impact
Negligible	The resource impact is not expected to be detectable or measurable	The impact is not expected to be detrimental to the resource	Not applicable
Low	The resource impact is expected to be detectable or measurable	The impact is not expected to be detrimental to the resource	Short- or long-term
Moderate	The resource impact is expected to be detectable or measurable	The impact is expected to be moderately detrimental to the resource	Short- or long-term
High	The resource impact is expected to be detectable or measurable	The impact is expected to be highly detrimental to the resource	Short- or long-term

Relevant Agreements, Laws, Plans, Rules, and Regulations

The US Fish and Wildlife Service has listed bull trout as threatened under the Endangered Species Act (USFWS 1999, 2015a, 2015b). Both bull trout and westslope cutthroat trout are listed as S2 Montana Animal Species of Concern. Species classified as S2 are considered to be at risk due to very limited and/or potentially declining population numbers, range, and/or habitat, making the species vulnerable to global extinction or extirpation in the state (Montana Fish, Wildlife and Parks, Montana Natural Heritage Program, and Montana Chapter American Fisheries Society Rankings). DNRC has also identified bull trout and westslope cutthroat trout as sensitive species (ARM 36.11.436).

DNRC is a cooperator and signatory to the following relevant agreements: Restoration Plan for Bull Trout in the Clark Fork River Basin and the Kootenai River Basin, Montana (2000), Memorandum of Understanding (2005) for the and Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana (2007). All 3 agreements contain land management conservation strategies or action items utilized by DNRC as decision-making tools.

Fisheries-specific forest management ARMs (36.11.425 and 36.11.427), the SMZ Law and rules, and other site-specific prescriptions would be implemented as part of any action alternative.

All waterbodies contained in the fisheries analysis areas are classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.608[b][i]). B-1 classification is for multiple beneficial-use waters, including the growth and propagation of cold-water fisheries and associated aquatic life. Among other criteria for B-1 waters, a 1-degree Fahrenheit maximum increase above naturally occurring water temperature is allowed within the range of 32 to 66

degrees Fahrenheit (0 to 18.9 degrees Celsius), and no increases are allowed above naturally occurring concentrations of sediment or suspended sediment that will harm or prove detrimental to fish or wildlife. In regard to sediment, naturally occurring includes conditions or materials present from runoff or percolation from developed land where all reasonable land, soil, and water conservation practices have been applied (ARM 17.30.603[19]). Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses (ARM 17.30.603[24]). The State has adopted BMPs through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities.

Existing Conditions

Cottonwood Creek Analysis Area

The Cottonwood Creek Analysis Area comprises the lower portion of the Cottonwood Creek watershed, including river miles 8.5–11.5 on Cottonwood Creek and several perennial and intermittent tributaries (Map WS-2). Proposed actions in this analysis area that may affect fisheries resources include; 1) upland timber harvest, 2) riparian timber harvest, 3) forest road construction and maintenance, 4) road-stream crossing improvements, and 5) forest road utilization for timber hauling and equipment transportation. Fisheries resource variables potentially affected by the proposed actions are channel form, sediment, flow regime, large woody debris, and stream temperature. Assessment of these resources will be qualitative. Fisheries habitat connectivity is not expected to be measurably affected by the proposed actions.

Native and non-native species currently found in project area streams are found in Table F-2 (MFISH 2017). Bull trout are known or presumed to occupy 22.9 miles of stream in the analysis area, including 0.9 miles of Cottonwood Creek in 16N 14W 24. Westslope cutthroat trout occupy 34.6 miles of stream, including 0.9 miles of Cottonwood Creek, and 1.1 miles in two unnamed tributaries in 16N 14W 26. Mountain whitefish (*Prosopium williamsoni*) are found in the upper portion of Cottonwood Creek (5.9 miles), there are no records of this species in the proposed project area. Longnose dace (*Rhinichthys cataractae*) have also been observed in the lower 3.2 miles of Cottonwood Creek. Non-native species found in the Cottonwood Creek watershed include brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), and hybrid bull x brook trout (Table F-2). Stream gradients range from 1.6–5.9% in streams supporting fish populations in this analysis area. Due to the existing non-native fish populations present in the analysis area, there is a high existing adverse impact on native species in the analysis area. No road-stream crossings in this analysis area currently limit fisheries connectivity, as such there is no existing impact to connectivity.

Assessment of road infrastructure in this analysis area found approximately 4.0 miles of existing forest road within 300 feet of perennial and intermittent stream channels and six existing road-stream crossing structures. Approximately 1.3 miles of road are within 300 feet of perennial streams, with 2.7 miles within 300 feet of intermittent streams. Two road-stream crossings do not meet BMPs and are currently contributing sediment to Cottonwood Creek (Tables F-3, F-4).

Table F-2: Current Status of Fisheries Populations in Kozy Korner Timber Sale Analysis Areas.

Species		Analysis Area	
		Cottonwood Creek	Shanley Creek
Native	Bull Trout	X	
	Westslope Cutthroat Trout	X	X

	Mountain Whitefish	X	
Non-native	Brown Trout	X	X
	Brook Trout	X	X
	Rainbow Trout	X	

Table F-3: Existing, Planned Construction, and Planned Abandonment of Roads in the Kozy Korner Timber Sale Analysis Areas.

Analysis Area	**Road Class**		**Road Miles Within 300 ft**		
		All Roads	Perennial Stream	Intermittent Stream	All Streams
Cottonwood Creek	Existing	25.3	1.4	0.0	1.4
	New Construction	0.9	0.2	0.0	0.2
	Abandoned	7.3	2.6	0.0	2.6
Shanley Creek	Existing	14.6	0.3	0.4	0.7
	New Construction	1.5	0.2	0.2	0.4
	Abandoned	5.2	1.9	0.7	2.6

Table F-4: Existing and Planned Road-Stream Crossings on Perennial and Intermittent Streams in the Kozy Korner Timber Sale Analysis Areas.

Analysis Area	**Stream Type**	**Status**	**Haul Route Crossing Structures**	**Non-Haul Route Crossing Structures**	**Total Number of Equipment Crossings**
Cottonwood Creek	Perennial	Existing	4	2	3,974
		New	1	-	135
	Intermittent	Existing	0	0	0
		New	1	-	464
Shanley Creek	Perennial	Existing	1	4	47
		New	0	-	0
	Intermittent	Existing	3	2	375
		New	2	-	728

Three active grazing licenses are managed in the Cottonwood Creek analysis area, occurring over a total of 640 acres. In total, 83 AUMs are covered under the existing licenses, with a grazing season extending from June 1-October 15. Grazing impacts are light to moderate, with over-widened streams noted at several crossings, and some streambank disturbance and removal of riparian vegetation.

Based on the existing roads, road-stream crossings, and grazing impacts, there is an existing moderate impact on sediments in the analysis area.

Channel forms comprise the primary spatial component of fisheries habitat and include the frequency and volume of different slow and fast water features. Stream temperature is the primary thermal component of fisheries habitat and typically includes watershed-specific seasonal and daily fluctuations. Although channel forms and stream temperature are a function of numerous environmental processes, the variables of sediment, flow regime, woody debris and stream shading are major contributors that are also potentially affected by the proposed actions. Furthermore, the ranges of conditions of all of these variables throughout a watershed are highly varied, and the mechanisms by which they are naturally affected are also numerous and complex. See Water Resources Analysis (Attachment D) for detail regarding existing condition. Existing impacts to channel form in the Cottonwood Creek Analysis Area are moderate.

Riparian zone vegetation heavily influences the delivery and in-channel frequency of woody debris, a major component of channel forms. The riparian zone is also a major regulator (shading) of stream temperature, since direct solar radiation is an important driver of stream thermal regimes, especially during peak seasonal periods. Riparian vegetation within 100 feet of perennial streams is the primary influence on these two fisheries resource variables. (The average site-potential-tree-height at 100 years for dominant and co-dominant riparian tree species in the assessment area is 100 feet.) The estimated area within 100 feet of Cottonwood Creek is 447 acres, of which approximately 268 acres (60%) is forested. Two additional unnamed tributaries to Cottonwood Creek, on the eastern boundary of the analysis area, encompass an additional 20 acres of RMZ, all of which is forested. Riparian stand condition in all reaches has been subject to historic RMZ harvest, and along Cottonwood Creek, livestock grazing has influenced riparian vegetation and subsequently stream shading in areas. Existing impacts to stream temperature in the Cottonwood Creek Analysis Area are low.

Existing impacts to fisheries resources in this analysis area include the adverse impacts of non-native fish species, existing forest roads within 300 feet perennial or intermittent streams, numerous improved and unimproved road-stream crossings that may elevate sedimentation with periodic use but do not limit habitat connectivity, livestock grazing that may exacerbate sediment input, stream bank stability, and riparian vegetation, irrigation diversions and impoundments on private lands which alter the natural flow regime and potentially habitat connectivity between state trust lands and downstream habitat, and historic riparian timber harvest. Due to current and historic land use, annual water yield is likely elevated compared to fully forested and ungrazed conditions. Based on these conditions and subsequent direct and indirect impacts, a high existing cumulative effect to fisheries resources likely occurs in this analysis area.

Shanley Creek Analysis Area

The Shanley Creek Analysis Area comprises the majority of the Shanley Creek watershed from the confluence of Shanley Creek and Cottonwood Creek upstream to the headwaters of Dry Cottonwood Creek (Figure WS-2). Proposed actions in this analysis area that may affect fisheries resources include; 1) upland timber harvest, 2) riparian timber harvest, 3) forest road construction and maintenance, 4) road-stream crossing improvements or maintenance, and 5) forest road utilization for timber hauling and equipment transportation. Fisheries resource variables potentially affected by proposed actions in this analysis area include; channel form, sediment, flow regime, woody debris, stream shading, stream temperature, and fisheries connectivity.

Native and non-native species currently known to occupy or presumed to be present in this analysis area are found in Table F-2. Westslope cutthroat occupy approximately 15.5 miles of stream in the analysis area, including 2.2 miles of Dry Cottonwood Creek in 16N 13W 28 and 33. The westslope cutthroat population in the reach on state trust lands is assumed to be pure, and Dry Cottonwood Creek does not support any non-native species. Stream gradient of Dry Cottonwood Creek in the project area ranges from 1.4% in the lower portion of the project area where the stream flows through associated wetlands to 7.8% in the reach of stream south of the Cottonwood Lakes Road. Due to the existing non-native fish populations present in the analysis area, there is a moderate existing adverse impact on native species in the analysis area.

One existing road-stream crossing on upper Dry Cottonwood Creek limits fisheries connectivity between State Trust lands and upstream habitat on the Lolo National Forest. The existing structure is a metal culvert, the structure is undersized, does not match adjacent stream gradient, and has a drop of approximately 1.0 ft at the outlet. This structure is a high existing impact on the westslope cutthroat trout population in Dry Cottonwood Creek.

Channel forms comprise the primary spatial component of fisheries habitat and include the frequency and volume of different slow and fast water features. Stream temperature is the primary thermal component of fisheries habitat and typically includes watershed-specific seasonal and daily fluctuations. Although channel forms and stream temperature are a function of numerous environmental processes, the variables of sediment, flow regime, woody debris and stream shading are major contributors that are also potentially affected by the proposed actions. Furthermore, the ranges of conditions of all of these variables throughout a watershed are highly varied, and the mechanisms by which they are naturally affected are also numerous and complex. See Water Resources Analysis (Attachment D) for detail regarding existing condition. Based on existing channel conditions there is a moderate existing impact on channel form, and a low existing impact on stream temperature in the Shanley Creek Analysis Area.

Riparian zone vegetation heavily influences the delivery and in-channel frequency of woody debris, a major component of channel forms. The riparian zone is also a major regulator (shading) of stream temperature, since direct solar radiation is an important driver of stream thermal regimes, especially during peak seasonal periods. Riparian vegetation within 100 feet of perennial streams is the primary influence on these two fisheries resource variables. (The average site-potential-tree-height at 100 years for dominant and co-dominant riparian tree species in the assessment area is 100 feet.) The estimated area within 100 feet of Dry Cottonwood Creek is 168 acres, of which approximately 138 acres (82%) is forested. Historic riparian timber harvest has occurred along Dry Cottonwood Creek, however, regeneration has

occurred to a level where historic impacts are likely within the range of expected conditions. The existing impact to stream temperature in the Shanley Creek Analysis Area is low.

Existing impacts to fisheries resources in this analysis area include approximately 2.3 miles of road within 300 feet of a Class 1 stream, one existing road-stream crossing on Dry Cottonwood Creek that prevents fish passage between state trust lands and upstream habitat on federal land, numerous improved and unimproved road-stream crossings that may elevate sedimentation with periodic use but do not limit habitat connectivity, and historic riparian timber harvest. Due to historic upland and riparian timber harvest, annual water yield is likely elevated compared to a fully forested condition, but is likely within the historic range of conditions with respect to water yield, runoff timing, and peak or base flow rate. Based on the existing conditions and subsequent direct and indirect impacts, a moderate to high cumulative effect on fisheries resources likely occurs in the project area.

Environmental Effects

The environmental effects section will compare the existing conditions to the anticipated effects of the proposed No-Action and Action Alternatives to determine the foreseeable impacts to associated fisheries resources. Summary of Environmental Effects of the No-Action and Action Alternatives are found in Table F-5.

All Analysis Areas

No Action Alternative: Direct, Indirect, and Cumulative Effects

As a result of implementing the No-Action Alternative, no additional direct or indirect effects to fisheries resources would be expected to occur within the assessment area beyond those described in the Existing Conditions.

Future actions considered under cumulative effects will continue to occur including effects of non-native fish species on native species, fish connectivity limitations, forest management practices on adjacent private or federal lands, and various recreational uses. Open public roads in the analysis areas will continued to be utilized for forest management and recreational activities. Anticipated future actions are expected to be low to moderate risks to sediment and channel forms. In summary, cumulative effects of the No-Action Alternative are expected to be similar to those described in Existing Conditions.

Table F-5: Summary of Anticipated Effects of the No-Action and Action Alternatives on Fisheries Resources in the Kozy Korner Project Area.

Analysis Area	Fisheries Resource	Existing Impact/No Action				Action			
		No	Low	Moderate	High	No	Low	Moderate	High
Cottonwood Creek	Population				X				X
	Connectivity	X				X			
	Sediment			X			X		

	Channel Form		X				X		
	Stream Temp.		X				X		
	Cumulative Effects				X				X
Shanley Creek	Population			X				X	
	Connectivity				X	X			
	Sediment		X	X			X		
	Channel Form		X	X			X	X	
	Stream Temp.		X					X	
	Cumulative Effects			X	X			X	

Cottonwood Creek Analysis Area

Action Alternative: Direct, Indirect, and Cumulative Effects

Proposed actions potentially affecting fisheries resources in the Cottonwood Creek Analysis Area include;

- Use of main and secondary haul routes for timber and equipment transportation
- Construction of road-stream crossings on perennial and intermittent streams
- Road construction within 300 feet of perennial streams
- Upland timber harvest
- Riparian timber harvest
- Restoration of existing road-stream crossing

No direct or indirect effects to fisheries populations (presence/absence, genetic purity) are expected to occur in this analysis area under the proposed action alternative. Rainbow trout are presumed to be present in the analysis area, and fisheries surveys conducted collected several westslope cutthroat trout that appeared to have phenotypic characteristics consistent with hybridization with rainbow trout. No alterations to existing impoundments on private land are included in the proposed action, which likely isolate small populations of westslope cutthroat trout on state lands included in the project area, maintaining genetic purity at the current condition. The bull trout population in Cottonwood Creek will continue to exist in sympatry with brook and brown trout, resulting in continued hybridization risk with brook trout (Leary et al. 1993, Kanda et al. 2002, Rieman et al. 2006) and potential displacement by both species (Rieman et al. 2006, Al-Chokhachy et al. 2016). Adverse impacts of non-native species will continue to occur at the same levels as described under the *Existing Environment*. No existing or potential road-stream crossings currently limit connectivity in this analysis area, as such there is no impact on connectivity in this analysis area.

Within the analysis area, increased truck traffic will occur as a result of timber hauling and equipment transportation. This increase may accelerate mobilization and erosion of road surface material at road-stream crossings (Reid and Dunne 1984, Bilby et al. 1989, Coker et al. 1993, Luce and Black 2001). Four existing perennial road-stream crossings will be used in this analysis area to transport equipment and timber during the project. All crossing sites are on county roads open to public use throughout the year. All existing structures are metal culverts, two of which pose low risk of sediment input and two structures pose a moderate risk of sediment input to perennial streams in the project area. The foreseeable number of project related crossings at these four sites is 3,974 under the proposed action alternative. One new road-stream crossing is proposed on the eastern portion of the analysis area, the proposed structure will be a channel-spanning bridge on a stream that is not known to support native or non-native fisheries populations. The anticipated number of project related crossings at this site is 135 under the proposed action alternative. One existing road-stream crossing will be replaced on an intermittent stream in this analysis area, with an anticipated total of 464 project related crossings (Table F-4). The existing native log crossing at this site, will be excavated and replaced with a metal culvert which is anticipated to reduce sediment contribution and erosion of existing road fill into the stream channel. Two existing unimproved fords in section 24 on Cottonwood Creek will be restored, as the sites are currently over-widened and lack channel complexity. Restoration of these sites will involve reduction in width:depth ratio to match existing morphology upstream in unimpacted reaches and will incorporate riparian planting to stabilize eroded streambanks. Implementation of these restoration actions may result in short-term increases in the concentration of sediment delivered to the stream channel during construction activities, the duration and extent of the sediment contribution will be minor in comparison to not improving the sites.

Implementation of project related BMPs and road maintenance are planned at these crossing sites, which will direct most mobilized sediment away from the crossing and filter through existing roadside vegetation. These actions are anticipated to offset a large portion of the risk of sedimentation due to project related traffic at road-stream crossings. Additionally, improvement of several existing road-stream crossings in the analysis area is expected to reduce sediment inputs considerably at these locations (Sugden 2018). As a result of these improvements and implementation of BMPs, road-stream crossings are expected to present a low risk of low impacts to fisheries resources in the project area.

Upland harvest on sites with risk of erosion may mobilize material that could be delivered to adjacent stream channels; however, the Water Resources analysis indicates that the anticipated impacts from this action pose a moderate risk of direct and indirect impacts to fisheries resources, however, through implementation of BMPs and restoration of failed stream crossing sites is anticipated to have a long-term net benefit to sediment loads in the Cottonwood Creek Analysis Area. This assessment takes into consider the implementation of the SMZ Law and Rules and supplemental ARMs for Forest Management on high risk of erosion sites.

As described in the Water Resources analysis, the levels of proposed timber harvest is not expected to lead to measureable increases in water yield or consequent changes in flow regime. Riparian harvest of 50 percent of merchantable trees between 50 and 100 feet away from fish-bearing and non-fish-bearing perennial streams would occur along 1,600 ft of Cottonwood Creek, and a total of 4,216 ft along two unnamed tributaries in the analysis area. No harvest will occur within 50 ft of any perennial stream. In total, approximately 14.8 acres of forest in the Cottonwood Creek Analysis Area would have reduced potential for recruitment of LWD. This accounts for approximately 1.5 percent of the RMZ area along Cottonwood Creek, and less than 1.0 percent of the analysis area overall. Based on RMZ monitoring conducted on other streams on DNRC managed lands, this level of retention is anticipated to provide suitable LWD recruitment to maintain channel complexity and provide instream cover in this reach (DNRC 2012, DNRC

2018). RMZ monitoring under the HCP has indicated that large woody debris targets have been exceeded in all stands with RMZ harvest, and generally loading rates were similar or increased following RMZ harvest. As such, implementation of the action alternative is anticipated to have a low risk of low impact on channel form in this analysis area.

Riparian harvest of 50 percent of merchantable trees between 50 and 100 feet away from fish-bearing and non-fish-bearing perennial streams would occur along 1,600 ft of Cottonwood Creek in the analysis area. No harvest will occur within 50 ft of any perennial stream. In total, approximately 4.2 acres of forest adjacent to Cottonwood Creek would have reduced potential for recruitment of large woody debris (LWD). This accounts for approximately 1.5 percent of the RMZ area along Cottonwood Creek in the analysis area. Based on RMZ monitoring conducted on other streams on DNRC managed lands, this level of retention is anticipated to provide suitable LWD recruitment to maintain channel complexity and provide instream cover in this reach (DNRC 2012, DNRC 2018). RMZ monitoring under the HCP has indicated that large woody debris targets have been exceeded in all stands with RMZ harvest, and generally loading rates were similar or increased following RMZ harvest. Based on the proposed action, riparian timber harvest along this reach is anticipated to have a low risk of low impact on fisheries resources in the analysis area.

Establishment of no-harvest buffers of 50 feet has been shown to be effective at maintaining sufficient stream shading to minimize potential effects of riparian timber harvest on stream temperatures (DNRC 2012, DNRC 2018). Harvest of 50 percent of the trees from the 4.2-acre RMZ harvest area along Cottonwood Creek is anticipated to result in a reduction of stream shading, however, this reduction should not result in significant increases in the thermal regime of Cottonwood Creek. RMZ monitoring under the HCP has indicated that 90 percent of RMZ harvested stands have met temperature thresholds. Based on the proposed action, stream shading should be maintained at a sufficient level to pose a low risk of low impact of increasing stream temperature in the analysis area.

As part of the consideration of cumulative effects, all direct, indirect and other related impacts described in the Existing Conditions and Environmental Effects for the No-Action Alternative would be expected to continue. Additionally, low to moderate direct and indirect impacts may occur to sediments, low direct and indirect impacts may occur to channel forms, and low direct and indirect impacts may occur to stream temperature as a result of implementing the proposed actions. Considering all of these impacts collectively, moderate cumulative impacts to fisheries resources are expected in the assessment area.

Shanley Creek Analysis Area

Action Alternative: Direct, Indirect, and Cumulative Effects

The proposed actions are broadly described in Project Development on page 7 (Action Alternative). Project-specific BMPs and road maintenance would be applied to all segments of the haul routes through the assessment area (see Water Resources analysis). All impact descriptions are short-term unless otherwise noted.

Proposed actions potentially affecting fisheries resources in the Cottonwood Creek Analysis Area include;

- Use of main and secondary haul routes for timber and equipment transportation
- Road construction within 300 feet of perennial and intermittent streams
- Construction of new road-stream crossings on intermittent streams
- Upland timber harvest
- Riparian timber harvest

- Restoration of existing road-stream crossings

Fisheries Populations

No direct or effects to fisheries populations (presence/absence, genetic purity) are expected to occur in this analysis area under the proposed action alternative. Westslope cutthroat trout are present in Dry Cottonwood and Shanley creeks no other native species are known to occupy any other streams in within the project area in this analysis area (Table F-1). Adverse impacts of non-native species will continue to occur at the same levels as described under the *Existing Environment*.

One stream crossing is known to limit connectivity in Dry Cottonwood Creek between state trust lands and the Lolo National Forest. This structure will be removed as a part of this project, restoring connectivity between 2.2 miles of stream on DNRC managed land and approximately 3.0 miles of stream on federal land. The existing structure currently prevents upstream movement of all life stages of westslope cutthroat in Dry Cottonwood Creek. During the project, the site will be stabilized and erosion control measures will be constructed adjacent to the crossing, and it will be used to haul timber from two portions of harvest unit 4. Following completion of harvest activities in these areas, the structure will be removed, and the stream channel and floodplain at the crossing site will be restored to emulate existing upstream channel morphology. While the current condition is a high adverse impact to the population, ultimately the removal of this structure will benefit westslope cutthroat in Dry Cottonwood Creek by increasing available habitat and potentially improve genetic diversity within the population.

Sediment

Within the analysis area, increased truck traffic will occur as a result of timber hauling and equipment transportation. This increase may accelerate mobilization and erosion of road surface material at road-stream crossings (Reid and Dunne 1984, Bilby et al. 1989, Coker et al. 1993, Luce and Black 2001). No new road-stream crossings are proposed on perennial streams in this analysis area. One existing perennial road-stream crossing will be used in this analysis area to transport equipment and timber during the project (Figure F-3). The anticipated number of project related crossings at this site is 47 under the proposed action alternative. The existing structure is a metal culvert, which is a low risk of sediment input. Following completion of forest management activities in this portion of the harvest unit, the crossing structure will be removed and the stream channel will be restored to emulate reference conditions upstream. Temporary increases in sediment will result from removal of the structure and subsequent restoration of the stream channel. These impacts are expected to be minor in duration, with the resulting channel exhibiting higher stability and lower risk of sediment input that the existing structure. Four additional perennial stream crossings are present in the analysis area, none of which are included on the haul route. Three of the existing stream crossings are failed log structures on Dry Cottonwood Creek that will be improved to restore channel and floodplain morphology. Increased sediment input will likely occur during restoration of the stream channel at these sites, however the duration and extent is anticipated to be minor, with resulting sediment input significantly lower than the existing state. Three existing intermittent stream crossings will be used to haul timber and equipment in the analysis area. The anticipated number of project related crossings at these sites is 375 under the proposed action alternative. Following completion of forest management activities, one haul road crossing on Lost Creek will be removed and the site will be restored to natural channel conditions. Two additional sites on Lost Creek which are currently contributing sediment, but not included on the haul route, will be restored to natural channel conditions. Restoration activities at these sites will be conducted during dry periods and should not result in significant sediment inputs. Two new road-stream crossings will be

constructed on intermittent streams in the analysis area. The anticipated number of crossings at these sites is 728 under the proposed action alternative.

Implementation of project related BMPs and road maintenance are planned at all perennial and intermittent crossing sites, which will direct most mobilized sediment away from the crossing and filter through existing roadside vegetation. These actions are anticipated to offset a large portion of the risk of sedimentation due to project related traffic at road-stream crossings. Additionally, improvement of several existing road-stream crossings in the analysis area is expected to reduce sediment inputs considerably at these locations. Road-stream crossings are expected to present a low risk of moderate impacts to fisheries resources in the project area. Moderate impacts are anticipated during removal and restoration of several failed crossing sites on Dry Cottonwood Creek, however these impacts are expected to be a low long-term risk based on the improvement in relation to the current status.

Use of project haul routes may result in erosion of forest road surface and lead to potential delivery of fine sediments to stream channels in the analysis area. Through the application of forestry BMPs including; road design, maintenance, and haul route planning, sediment delivery is expected to be reduced under the action alternative. The sediment delivery capacity of haul route roads is generally related to the proximity of the road to perennial and intermittent streams in the project area. In this analysis area, 0.3 miles of existing road, 0.2 miles of new road construction, and 1.9 miles of existing road will be abandoned within 300 feet of perennial streams (Table F-2). Adjacent to intermittent streams, 0.7 miles of existing, 0.2 miles of new construction, and 0.7 miles of abandoned road are present in the analysis area. Implementation of BMPs during planning, construction, and maintenance during the project is anticipated to reduce sediment risks from forest roads adjacent to perennial and existing streams in the analysis area.

Primary considerations for impacts to sediments in this analysis include; 1) implementation of BMPs and road maintenance, 2) low short- and long-term impacts associated with sediment delivery due to project related traffic, road construction, and road-stream crossing construction and improvement, and 3) implementation of the SMZ law to mitigate risks of upland harvest on sediment delivery. Based on the positive impacts of BMP implementation, road abandonment, and road-stream crossing restoration and improvement offsetting a portion of the potential impacts of increased traffic, road construction, road-stream crossing, upland harvest and riparian timber harvest, a low risk of low impacts is expected for sediments in this analysis area under the action alternative.

As described in the Water Resources analysis, the levels of proposed timber harvest is not expected to lead to measureable increases in water yield or consequent changes in flow regime. Riparian harvest of 50 percent of merchantable trees between 50 and 100 feet away from fish-bearing and non-fish-bearing perennial streams would occur along 5,282 ft of Dry Cottonwood Creek, in the analysis area. No harvest will occur within 50 ft of any perennial stream. In total, approximately 12.6 acres of forest adjacent to Dry Cottonwood Creek would have reduced potential for recruitment of LWD. This accounts for approximately 9.1 percent of the RMZ area along Dry Cottonwood Creek in the analysis area. Based on RMZ monitoring conducted on other streams on DNRC managed lands, this level of retention is anticipated to provide suitable LWD recruitment to maintain channel complexity and provide instream cover in this reach (DNRC 2012, DNRC 2018). RMZ monitoring under the HCP has indicated that large woody debris targets have been exceeded in all stands with RMZ harvest, and generally loading rates were similar or increased following RMZ harvest. Based on the proposed action, and due to the scope of the proposed riparian timber harvest along this reach is anticipated to have a moderate risk of moderate impact on fisheries resources in the analysis area.

Establishment of no-harvest buffers of 50 feet has been shown to be effective at maintaining sufficient stream shading to minimize potential effects of riparian timber harvest on stream temperatures (DNRC 2012, DNRC 2018). Harvest of 50 percent of the trees from the 12.6-acre RMZ harvest area along Dry Cottonwood Creek is anticipated to result in a reduction of stream shading, however, this reduction should not result in significant increases in the thermal regime of Cottonwood Creek. RMZ monitoring under the HCP has indicated that 90 percent of RMZ harvested stands have met temperature thresholds. Due to the scope of the proposed riparian harvest, stream shading should be maintained at a sufficient level to pose a low risk of moderate impact of increasing stream temperature in the analysis area.

Fisheries Mitigations

The analysis and levels of effects to fisheries resources are based on implementation of the following mitigation measures.

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, DNRC HCP measures and reasonable mitigation and erosion control practices during timber harvest, road maintenance, road construction and road use activities to reduce sedimentation and minimize effects to fisheries.
- DNRC would locate, clearly mark, and maintain suitable water resource protection boundaries including SMZ's, RMZ's, and WMZ's adjacent to streams and wetlands as consistent with State Forest Land Management rules and the BCWMA conservation easement.
- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading, installation of drainage features to prevent surface erosion and sediment delivery to the stream, ditching to improve road surface stability, and gravel surfacing of selected segments as needed to comply with BMP's and protect water quality.
- Road use would be limited to dry or frozen ground conditions to reduce rutting, potential erosion, and sedimentation. New road construction, including drainage features, would be completed in the fall prior to freeze-up. Check snow/frozen ground conditions prior to operations. Minimal effects are expected with snow road construction.
- New roads would be closed to motor vehicles upon completion of harvest activities. Slash would be placed on main skid trails to protect soils and reduce erosion potential and unauthorized ATV use where appropriate.
- Culvert replacements would implement erosion control and stream protection and meet the requirements of the DFWP 124 permit issued for this project.

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Attachment F: Wildlife Resources

Kozy Korner – Wildlife Analysis

Analysis Prepared By:

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Introduction

The following sections disclose the anticipated direct, indirect, and cumulative effects to wildlife resources from the proposed action in the project area and cumulative-effects analysis areas described for each resource category. Past and ongoing activities on all ownerships, as well as planned future agency actions, have been taken into account in each cumulative-effects analysis for each resource topic.

Issues

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.

Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles.

Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range.

Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Regulatory Framework

Various legal documents dictate or recommend management direction for terrestrial wildlife species and their habitats on state trust lands. The documents most pertinent to this project include DNRC Forest Management Rules, the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Analysis Areas

The discussions of existing conditions and environmental effects within each subsection pertain to land areas of 2 different scales. The first scale of analysis is the Project Area (2,419 acres), which includes DNRC-managed lands in sections 24, 26, and 35 (northern portion) in T16N, R14W and sections 20, 29, 29, 32, and 33 in T16N R13W where activities are being proposed. The second scale is the cumulative-effects analysis area, which refers to a broader surrounding landscape useful for assessing cumulative effects to wildlife and habitat. For this proposed project, two distinct cumulative-effects analysis areas were identified. The first cumulative effects analysis area includes the project area and those lands within 1 mile of the project area (14,745 acres). This area includes 5,550 acres (38%) that are managed by USFS, 3,713 acres (25%) that are managed by DNRC, 2,864 acres (19%) that are privately-owned, 1,397 acres (10%) managed by Montana Fish, Wildlife, and Parks, 946 acres (6%) that are managed by The University of Montana, and 275 acres (2%) that are managed by The Nature Conservancy (TNC). The second cumulative effects analysis area is approximately 24,849 acres and includes the area south of the grizzly bear recovery zone within the Cottonwood and Shanley sub-watersheds and north of the Cottonwood Lakes Road. This cumulative effects analysis area contains sizeable areas managed by USFS (17,491 acres, 70%), with smaller amounts managed by DNRC (3,051 acres, 12%), in private ownership (2,930 acres, 12%), managed by The University of Montana (1,058 acres, 4%), and trace amounts managed by TNC, BLM, and FWP.

Analysis Methods

Analysis methods are based on DNRC State Forest Land Management Rules, which are designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, and consultation with other professionals.

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, and species managed as big game by the Montana Dept. of Fish Wildlife and Parks (DFWP).

Coarse Filter Wildlife Analysis

Issue

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Introduction

A variety of wildlife species rely on mature to old stands for some or all life requirements. Mature forests, generally characterized by abundant large diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipter gentilis*), and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open, non-forested patches that over time develop into young, conifer forests. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on a 24,849-acre area described above in the Analysis Areas portion of this analysis. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Affected Environment

The project area currently contains approximately 537 acres (22% of project area) of mature stands (100-plus years in age) of Douglas-fir, western larch, and mixed conifer stands that have a reasonably closed canopy. Currently, forested areas cover most of the project area, facilitating some use by those species requiring connected-forested conditions and/or forested-interior habitats. Ongoing tree mortality within the project area is altering existing forested cover,

forested-interior habitats, and landscape connectivity. Recent wildfire activity in a small portion of the project area altered forested cover and is being salvage logged.

Roughly 810 acres of mature stands of Douglas-fir, western larch, ponderosa pine, and mixed conifers exist on DNRC-managed lands within the cumulative effects analysis area. The recent Rice Ridge fire burned roughly 11,208 acres (45%) of the cumulative effects analysis area. A portion of the 6,034 acres (24% non-DNRC lands) of forested habitats and some of the 3,688 acres (15% non-DNRC lands) of moderately stocked forested stands on other ownerships in the cumulative effects analysis area are likely also providing habitat for those species requiring mature, forested habitats and/or forested connectivity. Conversely, much of the 15,153 acres (61% of non-DNRC lands) of burned areas, shrubs, herbaceous areas, poorly stocked forested stands, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful for these species requiring forested habitats. Ongoing tree mortality within the cumulative effects analysis area is altering existing forested cover, forested-interior habitats, and landscape connectivity. Past timber management, recent wildfire activity, human developments, roads, and the natural openness of certain habitats in the cumulative effects analysis area has influenced landscape-level connectivity in the cumulative effects analysis area. Ongoing timber management in the cumulative effects analysis area would continue altering mature forested stands and overall landscape connectivity, including any potential salvage activity on USFS-managed lands.

Environmental Effects- Mature Forested Habitats and Landscape Connectivity

No Action Alternative: Direct and Indirect Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. Continued tree mortality would further alter existing forested cover, forested-interior habitats, and landscape connectivity. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no direct or indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) no further changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur, and 3) no alterations to existing corridors would be anticipated.

No Action Alternative: Cumulative Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. Ongoing tree mortality within the cumulative effects analysis area is altering existing forested cover, forested-interior habitats, and landscape connectivity. Past harvesting has reduced the amount of mature, forested habitats in a portion of the cumulative effects analysis area; however, continued successional advances across the cumulative effects analysis area are moving stands toward mature forests. This alternative would not further reduce the amount of mature forested stands in the cumulative-effects analysis area. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) no further changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur; and 3) no alterations to existing corridors would be anticipated.

Action Alternative: Direct and Indirect Effects

Approximately 394 acres (49%) of existing mature Douglas-fir, western larch/Douglas-fir, and mixed conifer stands with a reasonably closed canopy would be harvested. In general, habitats for those species adapted to more-open forest conditions would increase in the project area, meanwhile habitats for wildlife species that prefer dense, mature forest conditions would be reduced in the project area. Although proposed harvesting on 1,631 acres (67% of the project area) would create more open stands that may be less suitable for wildlife species that use mature stands to move through the landscape, corridors, particularly along riparian features, would be retained. Proposed pre-commercial thinning and planting would improve the development of future mature forested stands in those areas treated. No changes in legal motorized public access would occur in the project area. Additionally, the only permanent human development constructed would be roughly 2 miles of new, restricted roads; however, this could increase non-motorized human activity in the project area beyond the proposed timber management activities. Contract stipulations would minimize the presence of human-related attractants for the duration of the proposed activities. Some changes in visual screening would occur within individual units, but the combination of irregular-shaped units, topography, un-harvested patches throughout the project area, and distance from open roads would minimize the effects of the reductions in visual screening. Thus, a moderate risk of adverse direct and indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce forested cover in a sizeable portion of the project area (67%), but corridors would be retained; 2) increased human developments in the form of restricted roads, could concentrate human activity, but no changes in human-related attractants would occur; 3) no changes to legal motorized public access would occur, but increases in non-motorized access could facilitate increased human use of the project area; and 4) visual screening in portions of the project area would be reduced, but some visual screening would be retained across the project area.

Action Alternative: Cumulative Effects

Modifications to mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities in the cumulative effects analysis area as well as any ongoing salvage logging associated with the recent Rice Ridge wildfire that may occur on USFS-managed lands. Across the cumulative effects analysis area, a variety of stands are providing for wildlife movements. Minor increases in human developments would occur with the proposed construction of roughly 2 miles of restricted roads. No changes in the presence of human-related attractants would occur. No changes to legal motorized public access to the cumulative effects analysis area would occur. Minor reductions in visual screening in a small portion of the cumulative effects analysis area would be anticipated. Thus, a minor risk of adverse cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce forested cover in a small portion of the cumulative effects analysis area, but corridors would exist; 2) minor increases in human developments that could concentrate human activities would occur, but no changes in human-related attractants would occur; 3) no changes to motorized public access would occur; and 4) visual screening in a small portion of the cumulative effects analysis area would be reduced, but considerable visual screening would persist across the cumulative effects analysis area.

Fine Filter Wildlife Analysis

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. Table WI-1 – Fine Filter provides an analysis of the anticipated effects for each species.

Table WI-1 –Anticipated Effects of the Kozy Korner Project on wildlife species

Species/Habitat	Potential for Impacts and Rationale [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Threatened and Endangered Species	
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	[Y] Detailed analysis provided below.
Canada lynx (*Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	[Y] Detailed analysis provided below.
Yellow-Billed Cuckoo (*Coccyzus americanus)* Habitat: Deciduous forest stands of 25 acres or more with dense understories and in Montana these areas are generally found in large river bottoms	[N] No suitable deciduous riparian habitats are in the project area. Thus, no direct, indirect, or cumulative effects to yellow-billed cuckoos would be expected to occur as a result of either alternative.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest less than 1 mile from open water	[Y] Detailed analysis provided below.
Black-backed woodpecker *(Picoides arcticus)* Habitat: Mature to old burned or	[N] While roughly 60 acres of preferred, recently (less than 5 years) burned areas are in the project area. These habitats are in the process of being harvested under another EA and no further habitat alterations would occur. A slight potential for disturbance

beetle-infested forest	to black-backed woodpeckers could occur with ongoing activities, and any proposed activities could further disturb black-backed woodpeckers, but proposed activities would avoid much of the nesting period. Thus, negligible further direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Coeur d'Alene salamander *(Plethodon idahoensis)* Habitat: Waterfall spray zones, talus near cascading streams	[N] No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse *(Tympanuchus Phasianellus columbianus)* Habitat: Grassland, shrubland, riparian, agriculture	[N] No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	[N] No suitable lakes occur in the project area. Thus no direct, indirect, or cumulative effects to common loons would be expected under either alternative.
Fisher *(Pekania pennanti)* Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[Y] Detailed analysis provided below.
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest	[Y] Detailed analysis provided below.
Gray Wolf *(Canis lupus)* Habitat: Ample big game populations, security from human activities	[Y] Detailed analysis provided below.

Harlequin duck *(Histrionicus histrionicus)* Habitat: White-water streams, boulder and cobble substrates	[N] No suitable high-gradient stream or river habitats occur in the project area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Mountain plover (*Charadrius montanus*) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] No prairie dog colonies or other shortgrass prairie habitats occur in the project area. Thus, no direct, indirect, or cumulative effects to mountain plovers would be anticipated to occur as a result of either alternative.
Northern bog lemming *(Synaptomys borealis)* Habitat: Sphagnum meadows, bogs, fens with thick moss mats	[N] Although numerous wetland complexes exist in the project area, little to no sphagnum moss habitats were observed in most of the wetland areas. Where sphagnum moss was present, it was generally a very minor and dispersed component of the vegetative community and the potential of use by northern bog lemmings would be low. Any proposed activities under either alternative would protect existing streams, riparian areas, and SMZ habitats, including any potential northern bog lemming habitats. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	[N] No preferred cliffs or suitable rock outcrops suitable for use by peregrine falcons occur on, or within 1 mile of the proposed project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	[Y] Detailed analysis provided below.
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the project area or vicinity. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Wolverine *(Gulo gulo)* Habitat: Alpine tundra and high-elevation boreal and coniferous	[N] Generally wolverines are found in sparsely inhabited remote areas near treeline characterized by cool to cold temperatures year round and rather deep and persistent snow well into the spring (Copeland et al. 2010). The availability and distribution of food is likely the primary factor in the large home range sizes of wolverines (Banci 1994). The project area is generally below the

forests that maintain deep persistent snow into late spring	elevations where wolverines tend to be located. No areas of deep persistent spring snow occur in the project area. Individual animals could occasionally use lands in the project area while dispersing or possibly foraging, and they could be displaced by project-related disturbance if they are in the area during proposed activities. However, given their large home range sizes (~150 sq. mi. -- Hornocker and Hash 1981), and manner in which they use a broad range of forested and non-forested habitats, the proposed activities and alterations of forest vegetation on the project area would have negligible influence on wolverines. Thus, minimal direct, indirect or cumulative effects to wolverines would be anticipated.
Big Game Species	
Elk	[Y] Big game winter range exists in the project area. Potential big game security habitat exists in the project area - Detailed analysis provided below.
Moose	
Mule Deer	
White-tailed Deer	

Threatened and Endangered Species

GRIZZLY BEAR

Issue

Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Introduction

Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The search for food drives grizzly bear movements, with bears moving from low elevations in spring to higher elevations through the summer and early fall, as fruits ripen throughout the year. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing human access into secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase the risk of bears being illegally shot. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on a 24,849-acre area described above in the Analysis Areas portion of this analysis. This area approximates the home range size of a female grizzly bear.

Existing Environment

The project area is 2 miles south of the Northern Continental Divide Ecosystem grizzly bear recovery area, and within `occupied' grizzly bear habitat as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger et al. 2002). However, grizzly bears are increasingly being documented south of the recovery zone. Grizzly bears have been documented in the project area in the past and continued use of the project area is likely. Grizzly bears generally use different habitats relative to season, but the combination of habitat attributes in the project area supports grizzly bears throughout the non-denning period.

Managing human access is a major factor in management for grizzly bear habitat. There is a minor amount of open roads (3.9 miles) in the project area. However, the locations of these roads and the presence of open roads just off DNRC-managed parcels would be anticipated to have effects to grizzly bears that would be similar to areas with higher levels of motorized access. Extensive non-motorized access to the project area exists given the presence of the open roads, the relatively gentle terrain, and the 26.5 miles of restricted roads in the project area. Open road densities are moderately high in the cumulative effects analysis area (1.5 mi./sq. mi., simple linear calculation); the potential for disturbance to grizzly bears in the cumulative effects analysis area is also fairly high given this level of access. Hiding cover exists on roughly 1,474 acres (61%) in the project area. Approximately 50 acres of potential grizzly bear hiding cover in the project area burned in the Rice Ridge fire in 2017 and is being salvage logged. No grizzly bear security habitats (≥ 0.3 miles from roads receiving motorized use and ≥2,500 acres in size) exist solely within the project area, but habitats in the project area contribute to 2 blocks of potential security cover that extends beyond the project area, neither of which were affected by the recent Rice Ridge wildfire.

Within the cumulative effects analysis area, roughly 1,824 acres of grizzly bear hiding cover exists on DNRC-managed lands. The recent Rice Ridge fire burned roughly 11,208 acres (45%) of the cumulative effects analysis area, and 2,134 burned acres (19%) are proposed for salvage logging on USFS lands. Grizzly bear hiding cover is likely present on some of the 6,030 acres (24% of non-DNRC lands) of forested stands with a reasonably closed canopy across the cumulative effects analysis area on other ownerships. Within the cumulative effects analysis area, hiding cover is largely absent from the 12,602 acres (51% of non-DNRC lands) of burned habitats, shrubs, herbaceous, and non-forested habitats and is likely somewhat limited on the other 6,240 acres (25% of non-DNRC lands) of sparsely stocked and young forest habitats in the cumulative effects analysis area. While no grizzly bear security habitats exist solely in the project area, portions of the project area contribute to 2 larger blocks of potential grizzly bear security habitat that total 6,832 acres; both blocks of potential grizzly bear security habitats look to extend beyond the boundaries of the cumulative effects analysis area as well. The recent wildfire did not enter either of the potential blocks of grizzly bears security habitats. Timber harvesting and human development that has occurred in the cumulative effects analysis area likely altered grizzly bear habitats and/or human disturbance levels. Ongoing timber management, including any potential salvage on USFS-managed lands in the cumulative effects analysis area could continue altering potential grizzly bear habitats while introducing potential disturbance to grizzly bears.

Environmental Effects- Grizzly Bears

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to grizzly bears would be anticipated since: 1) no further disturbance or displacement would be expected, 2) no further changes in hiding cover would occur, 3) security habitat would not be altered, 4) no changes in long-term open-road density would be anticipated, and 5) no changes in availability of unnatural bear foods or attractants would occur.

No Action Alternative: Cumulative Effects

No appreciable changes to existing habitats would be anticipated; advances in succession within those recently harvested stands could improve hiding cover and potentially foraging habitats for grizzly bears. Thus, no further adverse cumulative effects to grizzly bears would be anticipated since: 1) no further changes in human disturbance levels would be expected; 2) no changes to open road density would occur; 3) no further modifications to hiding cover would occur; 4) no changes to security habitat would be expected; and 5) no changes in availability of unnatural bear foods or attractants would occur.

Action Alternative: Direct and Indirect Effects

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources in the project area. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These potential disturbances would only be present during proposed operations; therefore, the season of disturbance is important in addressing effects to grizzly bears. Proposed harvesting could occur during the denning period or the non-denning period, but would avoid the spring period (April 1-June 15) when grizzly bears are likely heavily using the area and are quite sensitive to human disturbance. Proposed activities conducted in the denning period would not be expected to disturb grizzly bears; some disturbance to grizzly bears would be possible with proposed activities that may occur during the non-denning period. Grizzly bears would be expected to still be in the area when proposed activities would occur during the non-denning, but grizzly bears would be able to access considerable other habitats in the vicinity. Overall, the proposed activities would occur in areas where moderate levels of grizzly bear use would be anticipated, but would occur during a time period when habitat availability would not be limited, thus minor potential for disturbance and displacement of grizzly bears.

About 2 miles of new, restricted roads would be constructed with the proposed activities. No changes in open road density or motorized public access would be anticipated. Some increases in non-motorized public access could occur on the newly constructed roads, which could facilitate minor increased contact between humans and grizzly bears. Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on most of the 1,014 acres (69%) of hiding cover proposed to receive treatments. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees would persist in several of the units, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 5 to 10 years. Although hiding cover would be reduced, no appreciable changes to security habitat would occur given no changes in open roads would occur in the project area.

Any unnatural bear foods or attractants (such as garbage) would be kept in a bear resistant manner. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal. Thus, a minor risk of adverse direct or indirect effects to grizzly bears would be anticipated since: 1) minor disturbance and displacement would be possible;

2) hiding cover would be reduced in a portion of the project area, but would remain in portions of the project area, and would be expected to recover in the short-term; 3) habitats in potential security habitat would be modified, but no changes in the availability of security habitats would occur; 4) no changes to long-term open road density would be anticipated; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Action Alternative: Cumulative Effects

The increased use of road systems during the proposed project could temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area. Collectively, short-term (2-4 years) increases in human disturbance would be anticipated in the cumulative effects analysis area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present. Hiding cover would be reduced on roughly 1,014 acres with the proposed treatments; no changes to the hiding cover on other ownerships would be anticipated. Reductions in hiding cover would be additive to the reductions from past timber harvesting, recent wildfire activity, ongoing harvesting (including any salvage harvesting that may occur on USFS-managed lands), as well as more permanent land-cover changes in the cumulative effects analysis area. Early successional stages of vegetation occurring in harvest units could provide additional foraging opportunities for grizzly bears. Quality of grizzly bear security habitat would be reduced in short-term, but would persist through time. No changes in long-term open-road density would be anticipated; a slight increase in non-motorized access to a small portion of the cumulative effects analysis area could occur with the proposed construction of roughly 2 miles of new, restricted roads. Thus, a minor risk of adverse cumulative effects to grizzly bears would be anticipated since: 1) increases in human disturbance levels in the short-term could occur in a small portion of the cumulative effects analysis area; 2) hiding cover would be removed in the short-term on 1,014 acres in the cumulative effects analysis area; 3) no changes in long-term open road density would occur, 4) quality of security habitats would be reduced, but would persist into the future; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

CANADA LYNX

Issue

Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.

Introduction

Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). Lynx in western Montana preferred mature, multi-storied stands with dense horizontal cover year-round; during the summer lynx also selected earlier successional stands with a high horizontal cover (Squires et al. 2010). For denning sites, the primary component appears to be abundant large woody debris, particularly in the form of downed logs, root wads, slash piles, and live trees (Squires et al. 2008). These conditions are found in a variety of climax vegetation habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) occurred in continuous dense forests of lodgepole pine, subalpine fir, and Engelmann spruce. These fires created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on a 24,849-acre area described above in the Analysis Areas portion of this analysis. The scale of this analysis area approximates the home range size of an individual lynx (Ruediger et al. 2000).

Existing Environment

The project area ranges from approximately 4,200 to 5,200 feet in elevation and is dominated by Douglas-fir, Douglas-fir/western larch, and ponderosa pine. Approximately 875 acres of lynx habitat occur in the project area (Table WI-2 – Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Kozy Korner Project). Much of this habitat is winter foraging habitats, with minor amounts of other suitable habitats (largely forested lands that provide cover to facilitate movement), summer foraging, and temporary non-suitable habitats. Approximately 60 acres of the project area burned in the recent Rice Ridge fire, but no potential Canada lynx habitats were affected by the wildfire. Connectivity of forested habitats in the project area is relatively good, but has been altered by past timber management and ongoing tree mortality.

On DNRC-managed lands within the cumulative effects analysis area, roughly 864 acres of winter lynx foraging habitats exist, along with roughly 58 acres of summer foraging habitats, 44 acres of other suitable habitats, and 144 acres of temporary non-suitable habitats. On other ownerships, there are roughly 6,034 acres (24% of non-DNRC lands) of forested stands with a reasonably closed canopy across the cumulative effects analysis area; a portion of those stands would likely be suitable lynx habitats and probably include some winter foraging habitats. Additionally, summer foraging habitats likely exists on a portion of the 6,240 acres (25% of non-DNRC lands) of sparsely stocked and young forest stands on other ownerships; no lynx habitats likely exist on the 12,602 acres (51% of non-DNRC lands) of burned habitats, shrubs, herbaceous, and non-forested types on other ownerships in the cumulative effects analysis area. Roughly 10,201 of these non-forested types are the result of the recent Rice Ridge wildfire and roughly 2,134 burned acres (19%) are proposed for salvage logging on USFS lands. Portions of these burned habitats would likely develop into suitable lynx habitats in the future as these stands become reestablished. Connectivity of lynx habitats within the cumulative effects analysis area is somewhat limited due to ownership, past timber management, human developments, agricultural fields, the recent wildfire, and the natural openness of certain habitats in the cumulative effects analysis area. Ongoing timber management in the cumulative effects analysis area could continue affecting Canada lynx habitats; similarly ongoing tree mortality within both the project and cumulative effects analysis areas would continue to affect Canada lynx habitats. The project area in not within any federal Lynx Analysis Units (LAUs). The project area is partially in DNRC's Seeley Lake Lynx Management Area (LMA). Roughly 2,104 acres of the project area (87%) are within the Seeley Lake LMA; approximately 2,597 acres of DNRC-managed lands in the cumulative effects analysis area (85%) are in the LMA. Within this LMA, roughly 64% of the total potential lynx habitats on DNRC-managed lands are in the various suitable habitat classes and 36% are in the temporary non-suitable habitat category, largely due to the Jocko Lakes fire of 2007. The LMA is dominated by winter foraging habitats (42% of the LMA), followed by temporary non-suitable (36%), with lesser amounts of other suitable (18%) and summer foraging (4%). A sizable portion of the temporary non-suitable lynx habitats in the Jocko Lakes fire area are regenerating towards other suitable habitats and would be expected to meet the criteria for the other suitable category when the next field update is completed. Roughly 80% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and

outside of the Lynx Management Areas, which includes the remaining portions of the project area, are in suitable lynx habitat categories.

Environmental Effects- Canada Lynx

No Action Alternative: Direct and Indirect Effects

In the short-term, no further changes in lynx habitat elements would be expected in the project area. Landscape connectivity would not be altered. Thus, a negligible risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) existing winter foraging habitats would persist; 2) summer foraging habitats would continue to be a relatively minor component in the project area; 3) the amount of temporary non-suitable habitats would not change; and 4) landscape connectivity would not be altered.

No Action Alternative: Cumulative Effects

No appreciable change in lynx habitats in the cumulative effects analysis area would occur. No appreciable changes to landscape connectivity would be anticipated. Roughly 80% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories with this alternative. Within the Seeley Lake LMA, roughly 64% of the total potential lynx habitats would be in the various suitable habitat classes and 36% would be in the temporary non-suitable habitat category. Winter foraging habitats would continue to represent roughly 42% of the total lynx habitats in the LMA. Thus, a negligible risk of adverse cumulative effects to lynx would be expected since: 1) winter foraging habitats would persist in the cumulative effects analysis area; 2) summer foraging habitats would persist in the near-term across the cumulative-effects analysis area, but longer-term availability of summer foraging habitats would likely decline without disturbance; 3) no changes in the amount of the cumulative-effects analysis area that is in the temporary non-suitable habitat class would occur; and 4) landscape connectivity would not be altered.

Action Alternative: Direct and Indirect Effects

Most of the proposed activities would not occur in mapped lynx habitats (1,095 acres; 67% of proposed units) and would not be expected to appreciably affect lynx; approximately 536 acres of lynx habitats (61% of lynx habitats in the project area) would be altered with this alternative (Table WI-2 – Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Kozy Korner Project). The proposed treatments in lynx habitats would be a combination of individual tree selection, shelterwood, old growth maintenance, pre-commercial thinning, and planting. Within the Lynx Management Area (LMA), treatments would be designed to ensure the overall amount of the LMA in suitable lynx habitat categories would not be reduced. On most of the habitats within the LMA proposed for treatment, prescriptions would retain trees of sufficient density (≥40% canopy closure) and size to continue to be considered `other' suitable habitats following proposed treatments. A small amount of discontinuous habitats on lands where DNRC's access is limited by neighboring landowners, would receive a shelterwood treatment that would transition these habitats to temporary non-suitable habitats. This small amount would not change the overall amount of the LMA that is in suitable habitat categories. Additionally, it is anticipated that this much or more habitat exists in the Jocko Lake burn scar that is meeting the definition of other suitable habitats but is currently classified as temporary non-suitable and would be updated in the near-term. Proposed treatments on DNRC-managed lands outside of the LMA would likely move 10 acres from winter foraging habitats into temporary non-suitable habitats. Thus, roughly only 11% of the lynx

habitats in the project area would be temporarily unsuitable for lynx following proposed treatments. Roughly 34% of the project area would be in foraging habitats and 56% would be in other suitable habitats following proposed treatments. The retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine fir and Engelmann spruce in foraging habitats, would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx. Coarse woody debris would be retained (emphasizing retention of some logs 15 inches dbh and larger) to provide some horizontal cover and security structure for lynx. Stands proposed for pre-commercial thinning in some or all of these lynx habitats would not be completed if the proposed thinning would cause the stand to no longer meet the definition of other suitable habitat following proposed treatments. Within these proposed pre-commercial thinning units in lynx habitats, small shade tolerant trees (such as sub-alpine fir and spruce) would be retained where possible to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands. Furthermore, in the LMA, DNRC is committed to retaining 20% of potential thinning units unthinned to provide to provide some areas of denser stocking that would provide higher quality habitat for snowshoe hares and thus foraging habitats for lynx. Thus, a minimum of 100 acres of unthinned stands in lynx habitats would need to be retained in the LMA. In the short-term, lynx use of the project area could decline due to the openness in the project area. Proposed activities would further reduce forested connectivity in the area; some connectivity would be retained along riparian areas and through unharvested patches between harvested units. Collectively, a moderate risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) the majority of winter foraging habitats (64%) would be removed with most moving into the other suitable habitat category; 2) a portion of the summer foraging habitats would be altered (37%) with most of those habitats moving into the other suitable habitat category; 3) the amount of the project area in the temporary non-suitable lynx habitat category would increase to 11%; and 4) connectivity could be altered, but some connectivity would be maintained along riparian areas and through unharvested patches between units.

Table WI-2 –Acres of Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Kozy Korner Project

		Within Lynx Management Area			**Outside Lynx Management Area**			
Lynx Habitat Element	**Exiting Condition and No-Action Alternative**	**Individual Tree Selection and Precommercial Thinning**	**Shelterwood**	**Old Growth Maint.**	**Individual Tree Selection and Precommercial Thinning**	**Shelterwood**	**Old Growth Maint.**	**Action Alternative**
Winter Foraging	751 (86%)	-441	-31	-1		-10		268 (31%)
Summer Foraging	35 (4%)	-13						22 (3%)
Other Suitable	38 (4%)	+ 454; 28 modified		+1				493 (56%)
Temporary Non-Suitable	52 (6%)	12 modified	+31			+10		93 (11%)

Total Lynx Habitats	875							875
Non-Lynx Habitats	1,544	871	7	56	146	16	0	1,544

Action Alternative: Cumulative Effects

Within the cumulative-effects analysis area, roughly 536 acres of lynx habitats on DNRC-managed lands (48% of DNRC-managed lynx habitats) would be modified, with most of these acres moving into the other suitable habitat category. Following proposed treatments, approximately 185 acres (17% of lynx habitats on DNRC-managed lands) would be in the temporary non-suitable habitat category following proposed treatments. The reductions in winter foraging (483 acres) and summer foraging (13 acres) coupled with increases in other suitable (455 acres) and temporary non-suitable habitats (41 acres) on a small portion of the cumulative effects analysis area could slightly decrease the quality of the lynx habitats in the larger cumulative effects analysis area. Near-term increases in summer foraging habitats could occur with the proposed harvesting within a portion of the cumulative effects analysis area; considerable summer foraging habitats would likely develop in the recent fire area in the next 10 years. Anticipated reductions in lynx habitats would be additive to past losses from timber harvesting and any ongoing modifications in the cumulative-effects analysis area, including any potential salvage associated with the recent Rice Ridge wildfire. Likewise, increases in temporary non-suitable lynx habitats would be additive to habitats that have been recently converted due to timber harvesting and wildfire. No appreciable changes to the suitable lynx habitats on other ownerships would be anticipated. Forest connectivity would be altered in the project area, but these reductions in connectivity would not appreciably alter connectivity in the cumulative effects analysis area. Connectivity of suitable lynx habitats along RMZs and associated riparian habitats would be maintained and overall negligible changes to connectivity across the cumulative effects analysis area would be anticipated. Roughly 80% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories following proposed treatments. Following proposed treatments, 64% of the total potential lynx habitats on DNRC-managed lands in the LMA would be in the various suitable habitat classes and 36% would be in the temporary non-suitable habitat category. Thus, a minor risk of adverse cumulative effects to Canada lynx would be expected since: 1) winter foraging habitats would persist; 2) summer foraging habitats would continue developing for the next 10 to 30 years across the cumulative effects analysis area; 3) a minor amount of lynx habitats would be in the temporary non-suitable habitat category; and 4) negligible alterations in landscape connectivity would not prevent lynx movements.

Sensitive Species

BALD EAGLE

Issue

Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles

Introduction

Bald eagles are diurnal raptors associated with significant bodies of water, such as rivers, lakes, and coastal zones. The bald eagle diet consists primarily of fish and waterfowl, but includes carrion, mammals, and items taken from other birds of prey. In Montana, bald eagles begin the breeding process with courtship behavior and nest building in early February; the young fledge by approximately mid-August, ending the breeding process. Preferred nest-stand characteristics include large emergent trees that are within sight distances of lakes and rivers and screened from disturbance by vegetation.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on home range associated with the BCWMA-Bandy bald eagle territory. This scale includes enough area for a nesting pair of bald eagles.

Existing Environment

Portions of the project area are within the home range associated with the Blackfoot Clearwater WMA-Bandy bald eagle territory. This territory has been fairly productive over the last 6-8 years. The aquatic habitats associated with the territory includes Cottonwood Creek, Upsata Lake, Bandy Reservoir, and numerous smaller streams, ponds, and wetlands. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitat incorporated by the territories is a coniferous/deciduous mixture along the lakeshores and riparian areas, with coniferous forests and grasslands in the upland areas. Within the home range, black cottonwood is the deciduous tree of primary importance to bald eagles, while large emergent conifers also provide important nesting, roosting, and perching habitats.

Human disturbance, including timber harvesting, agricultural activities, and various forms of recreation are potential sources of disturbance to the nesting territory. Numerous large emergent trees are available across portions of the home range, but logging and other human developments in the last 100 years has likely reduced some of these attributes while others have experienced mortality and are declining in quality.

Environmental Effects-Bald Eagle

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees suitable for perching or nesting would be expected.

No Action Alternative: Cumulative Effects

No cumulative effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected.

Action Alternative: Direct and Indirect Effects

No activities would occur in the nest area or primary use areas associated with the bald eagle territory. Proposed harvesting on 758 acres (46% of proposed units) would occur in the home range associated with the bald eagle territory. Proposed activities could occur when soils are dry, frozen, or snow covered and would not occur between April 1 and

June 15. Thus, the proposed activities could occur during the very early- (Feb 1- Mar 1) or later- (June 16-Aug 15) portions of the nesting season, or the non-nesting (August 16-February 1) season. Minor disturbance to bald eagles could occur for any activities that could be conducted during the nesting period. Conversely, no disturbance to bald eagles would be anticipated should those activities be conducted during the non-nesting period. Minor reductions in the availability of large snags or emergent trees that could be used as nest or perch trees could occur in the home range. No changes to human access to the home range would occur, thereby limiting potential for introducing additional human disturbance to the territory. Thus, a negligible risk of direct and indirect effects to bald eagles would be anticipated since: 1) disturbance could be slightly elevated within the home range during operations, should they occur during the nesting period; 2) no appreciable change in human access within the project area would occur; and 3) minor reductions in the availability of large, emergent trees could occur in the home range.

Action Alternative: Cumulative Effects

Nesting bald eagles would continue to experience varying levels of disturbance. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance, however no changes in bald eagle behavior would be anticipated. Negligible reductions in emergent trees or snags could occur on a small portion (6%) of the home range. Thus, a negligible risk of cumulative effects to bald eagles would be anticipated since: 1) disturbance would be slightly elevated within the territory during harvesting operations; 2) no changes in human access within the territory would occur; and 3) negligible changes in the availability of large, emergent trees would be expected.

FISHER

Issue

Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

Introduction

Fishers are a mid-sized forest carnivore whose prey includes small mammals such as voles, squirrels, snowshoe hares, and porcupines, as well as birds (Powell and Zielinski 1994). They also take advantage of carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of successional stages, but are disproportionately found in stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994) and avoid openings or young forested stands (Buskirk and Powell 1994, Weir and Corbould 2010). However, some use of openings may occur for short hunting forays or if sufficient overhead cover (shrubs or saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on the 24,849-acre cumulative effects analysis area described above in the Analysis Areas portion of this

analysis. This scale includes enough area to approximate overlapping home ranges of male and female fishers (Heinemeyer and Jones 1994).

Existing Environment

There are approximately 1,380 acres (56%) of potential upland fisher habitats and 96 acres (4%) of potential riparian habitats in the project area. Additionally, there are 111 acres of upland preferred habitats and another 27 acres of preferred habitats in riparian areas that presently lack structural attributes that would facilitate use by fisher. Existing habitats, particularly upland habitats, are reasonably connected across the more northerly portions of the project area where slightly moister forested conditions persist. Within the cumulative effects analysis area, there are roughly 23,494 acres that would be classified as upland (more than 100 ft from Class 1 and more than 50 feet from Class 2 streams) and 1,358 acres that would be classified as riparian that are associated with the 81 miles of streams in the cumulative effects analysis area. On DNRC-managed lands, 78% of the potential riparian fisher habitats in the cumulative effects analysis area are providing structural habitat attributes that would facilitate use by fisher. Potential fisher habitats likely exist on a portion of the 3,024 acres (14% of non-DNRC lands) of forested stands with a reasonably closed canopy that are below 6,000 feet in elevation across the cumulative effects analysis area, including roughly 233 acres that are in close proximity to streams in the cumulative effects analysis area. Within the cumulative effects analysis area, fisher habitats are largely absent from the 11,293 acres (51% of non-DNRC lands below 6,000 feet in elevation) of shrubs, herbaceous, burned stands, and non-forested habitats and is likely fairly limited on the other 5,212 acres (24% of non-DNRC lands below 6,000 feet in elevation) of sparsely stocked and young forest habitats in the cumulative effects analysis area. Ongoing timber management in the cumulative effects analysis area could continue to alter potential fisher habitats; approximately 2,134 acres (19%) of burned habitats are proposed for salvage logging on USFS lands which could alter fisher habitats.

Environmental Effects-Fisher

No Action Alternative: Direct and Indirect Effects

No direct and indirect effects to fishers would be anticipated since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be further altered; 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to public access or the potential for trapping mortality would be anticipated.

No Action Alternative: Cumulative Effects

No further cumulative effects to fishers would be anticipated since: 1) no further changes to existing habitats on DNRC-managed lands would occur; 2) any landscape connectivity afforded by the stands on DNRC-managed lands would not change appreciably; 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected; and 4) no changes to public access or the potential for trapping mortality would be anticipated.

Action Alternative: Direct and Indirect Effects

No riparian habitats within 50 feet of class 2 would be altered with the proposed activities, but approximately 3.5 acres of riparian fisher habitats along Dry Cottonwood Creek would be harvested. Proposed prescriptions in these riparian areas would retain at least 50% of existing stands and while this would reduce habitat quality for fisher, continued use by fisher could occur. Approximately 1,009 of the 1,380 acres (73%) of upland fisher habitats in the project area would

receive treatments that would reduce canopy closure and would likely be too open to be used by fisher. Proposed thinning and planting in fisher habitats would improve future fisher habitats by decreasing the time until those stands provide structural attributes needed by fisher. No changes in open roads would be anticipated; a slight increase in non-motorized access could occur with the proposed construction of 2 miles of restricted road. Trapping pressure and the potential for fisher mortality could remain similar to present levels. Minor reductions in landscape connectivity could occur with the proposed activities, but activities would avoid riparian areas commonly used by fisher. Thus, a minor risk of adverse direct and indirect effects to fisher would be anticipated since: 1) harvesting would largely avoid riparian areas, but would modify upland fisher habitats; 2) minor reductions in landscape connectivity would occur, but those areas associated with riparian areas would largely remain unaffected; 3) harvesting would reduce snags and snag-recruitment trees while increasing coarse woody debris levels; however, some of these resources would be retained; and 4) no changes in legal motorized human-access levels would be anticipated.

Action Alternative: Cumulative Effects

Since limited amounts of riparian habitats associated with Class 1 or 2 streams would be modified, but would continue to be potentially suitable for fisher, no changes in the amount of the preferred riparian fisher cover types meeting structural requirements for fishers at the cumulative-effects analysis area would occur. Reductions in upland habitats on DNRC-managed lands (1,009 acres) would further reduce the amount of suitable upland fisher habitats in the cumulative effects analysis area. These reductions would be additive to the losses associated with past timber harvesting in the cumulative-effects analysis area as well as any ongoing harvesting, including any potential salvage logging on USFS lands. No appreciable changes to landscape connectivity would be anticipated, and activities would avoid riparian areas commonly used by fisher. No changes in legal, motorized public access would occur. Minor increases in non-motorized access could occur. Overall, no appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, a minor risk of adverse cumulative effects to fisher would be anticipated since: 1) harvesting would modify some upland fisher habitats, but upland habitats would persist; 2) no appreciable changes in landscape connectivity would be anticipated and connectivity in riparian areas would not be altered; 3) harvesting in a relatively small portion of the cumulative-effects analysis area would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces; and 4) no changes to legal, motorized public access would occur.

FLAMMULATED OWLS

Issue

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

Introduction

Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. In Montana flammulated owls appear to initiate nesting later than most of the other owl species; they generally initiate nesting in May, and nestlings usually fledge during August. In general, preferred habitats have open to moderate canopy closure (30-50 percent) with at least 2 canopy layers, and are often near small clearings. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh ponderosa pine, Douglas-fir, or aspen. Without disturbance,

Douglas-fir encroach upon ponderosa pine stands resulting in increased stand density and decreased habitat quality for flammulated owls. Periodic, low-intensity underburns can increase habitat suitability and sustainability by reducing the density of understory seedlings and saplings, stimulating shrub growth, and by protecting large dominant trees from ladder fuels and competition with other mature trees.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on the 14,745-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support several pairs of flammulated owls (McCallum 1994).

Existing Environment

Flammulated owls have been detected adjacent to the DNRC-managed parcel on numerous occasions. There are approximately 1,385 acres (57% of the project area) of potential flammulated owl habitats in ponderosa pine and dry Douglas-fir stands across the project area. Approximately 60 acres of potential flammulated owl habitat in the project area burned in the Rice Ridge fire of 2017 and is being subsequently salvaged. Numerous snags were created in that part of the project area by the wildfire and while salvage activities are reducing snag densities, some snags were retained and the loss of nest trees would be expected to be minimal. The resultant, more open stand conditions in this small area, the retention of fire adapted tree species, and the maintenance of snags would be more representative of historical conditions, which is preferred flammulated owl habitat. There are an additional 718 acres of potential flammulated owl habitats on dry Douglas-fir and ponderosa pine stands on DNRC-managed lands within the cumulative effects analysis area. Some suitable habitats likely exist on a portion of the 5,098 acres (58% of non-DNRC-managed lands) of open and closed forested habitats on other ownerships in the cumulative effects analysis area; however, like the project area, portions of these forested areas are not likely preferred flammulated owl habitat types. Within the cumulative effects analysis area, the recent Rice Ridge wildfire burned roughly 1,801 acres which likely created additional snag habitats and reversed a portion of the Douglas-fir encroachment, but portions burned with such intensity that most of the trees were killed and the canopy cover was greatly diminished which made these areas likely unsuitable for flammulated owls. Additionally, much of this burned area was on USFS-managed lands where approximately 517 acres (29%) is proposed for salvage logging in the cumulative effects analysis area, which could remove numerous snags. Proposed salvage logging on USFS-managed lands would likely retain some snags within proposed units and extensive un-salvaged areas would also persist on USFS-managed lands. Elsewhere in the cumulative effects analysis area, some of the forested habitats have been harvested in the recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a portion of the Douglas-fir encroachment and opening up stands of ponderosa pine; however retention of large ponderosa pine and/or Douglas-fir was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Modern fire suppression has allowed Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls.

Environmental Effects-Flammulated Owl

No Action Alternative: Direct and Indirect Effects

Existing flammulated owl habitats in the project area would persist. Thus, a negligible risk of adverse direct and indirect effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

No Action Alternative: Cumulative Effects

Existing flammulated owl habitats would persist. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

Action Alternative: Direct and Indirect Effects

Flammulated owls can be tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur when flammulated owls are present. Proposed activities would not occur between April 1 and June 15, but could overlap the nestling and fledgling periods. Since numerous snags and large trees would be retained, loss of nest trees would be expected to be minimal. Proposed activities on 1,080 acres of potential flammulated owl habitats (78% of the habitats in the project area) would open the canopy while favoring western larch, ponderosa pine, and Douglas-fir. The proposed treatments would reduce canopy closure, which would allow more sunlight to reach the forest floor, which could stimulate grass and shrub growth, providing habitat for moths and other flying insects that provide food for flammulated owls. Elements of the forest structure important for nesting flammulated owls, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed units. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the project area toward historical conditions, which is preferred flammulated owl habitat. These improvements in flammulated owl habitats would be additive to any ongoing harvesting in the project area associated with the salvage logging activities. The proposed pre-commercial thinning on 922 acres of ponderosa pine and Douglas-fir types could improve flammulated owl foraging habitats, while contributing to an increased representation of ponderosa pine in the future in those stands, which would improve potential flammulated owl habitat quality. Thus, a minor risk of adverse direct and indirect effects would be expected to flammulated owls since: 1) the potential exists to disturb flammulated owls; 2) proposed thinning could lessen the duration before these affected stands are again suitable for flammulated owl use; and 3) harvesting would open denser stands up while retaining elements of forest structure used for foraging and nesting by flammulated owl, improving overall flammulated owl habitat conditions in the project area.

Action Alternative: Cumulative Effects

Disturbance in flammulated owl habitats would be possible on a small portion of the cumulative effects analysis area and could be additive to any other harvesting that may occur in the cumulative effects analysis area, including any proposed salvage logging in the Rice Ridge fire area. Proposed harvesting would increase the amount of the cumulative effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of losing snags and large trees important for nesting. Overall no change in the amount of potential flammulated owl habitats would exist on DNRC-managed lands or any other ownerships; a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative and the more historic conditions likely after proposed activities. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be expected since: 1) harvesting could disturb flammulated owls in a small portion of the cumulative effects

analysis area should activities occur during the period when flammulated owls are in the vicinity; and 2) harvesting would improve the quality and sustainability of flammulated owl habitat on a portion of the cumulative effects analysis area by making this area more representative of historic conditions.

GRAY WOLF

Issue

Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

Introduction

Wolves are a wide-ranging, mobile species that occupy a wide variety of habitats that possess adequate prey and minimal human disturbance, especially at den and/or rendezvous sites. Wolves are opportunistic carnivores that frequently take vulnerable prey (including young individuals, older individuals, and individuals in poor condition). In general, wolf densities are positively correlated to prey densities (Fuller et al. 1992, Oakleaf et al. 2006). In Montana, wolves prey primarily on white-tailed deer and elk (Kunkel et al. 1999, Arjo et al. 2002). Thus, reductions in big game populations and/or winter range productivity could indirectly be detrimental to wolf populations.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on the 24,849-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support at least 1 pack of wolves.

Existing Environment

The project area is partially in the Inez wolf pack annual home range area; additionally the project area is in the vicinity of the annual home range of the Morrell Mountain wolf pack. Wolves have been documented in the project area in the past. Several landscape features commonly associated with denning and rendezvous sites occur in the project area, such as areas with gentle terrain near a water source (valley bottoms), areas that are close to big game winter ranges, and areas that are close to meadows or other openings. No known den or rendezvous sites occur in the project area, but some use of the project area by wolves could occur for breeding, hunting, or other life requirements. Big game species exist in the project area much of the non-winter period. Winter range for mule deer (178 acres) and elk (2,081 acres) exists in the project area. Approximately 1,448 acres of the project area (60%) appear to be providing snow intercept and thermal cover attributes for big game. Approximately 60 acres of potential elk winter range burned in the recent Rice Ridge wildfire and is currently being salvage logged. The wildfire reduced much of the canopy closure, thermal cover, and snow intercept in that small part of the project area.

Within the cumulative-effects analysis area, big game species are fairly common and winter range for deer and elk are fairly widespread in the lower elevation areas of the cumulative effects analysis area. Roughly 9,090 acres of winter range (37%) exist in the cumulative effects analysis area; at least 6,034 acres (24%) of the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. The recent Rice Ridge wildfire burned roughly 10,201 acres of the cumulative effects analysis area, including roughly 1,636 acres within the winter range. Approximately 2,134 burned acres (19%) are proposed for salvage logging on USFS lands. Much of the canopy closure, snow-intercept, and thermal cover capacities in these burned areas has been reduced; limited or no use of the burned areas during the winter by big game would be anticipated. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water, near big game winter range, and in gentle terrain, occur in the cumulative-effects analysis area. Past timber management and human developments have altered big game and wolf habitats in the cumulative effects analysis area. Any potential salvage logging on USFS-managed lands could alter big game and/or wolf habitats.

Environmental Effects-Gray Wolf

No Action Alternative: Direct and Indirect Effects

Negligible direct and indirect effects would be expected to gray wolves since: 1) no changes in human disturbance levels would occur; and 2) no appreciable changes to prey availability would occur.

No Action Alternative: Cumulative Effects

White-tailed deer, mule deer, and elk winter ranges would not be further affected and substantive changes in big game populations, distribution, or habitat use would be not anticipated. Levels of human disturbance would be expected to remain similar to present levels. Past harvesting and any ongoing harvesting may cause shifts in big game use and, subsequently, gray wolf use, of the cumulative-effects analysis area; however, no further changes would be anticipated that would alter levels of gray wolf use of the cumulative-effects analysis area. Thus, no further cumulative effects to gray wolves would be expected since: 1) no changes in human disturbance levels would occur, particularly near known wolf den and/or rendezvous sites; and 2) no changes to prey availability would occur.

Action Alternative: Direct and Indirect Effects

Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites, which are not known to occur in the project area or within 1 mile of the project area. If a den or rendezvous site were identified within 1 mile of the project area, a DNRC biologist would be consulted to determine if additional mitigations would be necessary. Seasonal operations constraints would restrict activities between April 1 and June 15. These seasonal operations would limit potential disturbance at any potential den sites and rendezvous sites. No changes in legal, motorized public access would occur. After proposed activities, human disturbance levels would likely revert to pre-harvest levels; however increases in restricted roads could increase non-motorized human access and thus a slight increase in potential for disturbance to wolves in the project area. After proposed activities, wolf use of the project area for denning and rendezvous sites would likely revert to pre-harvest levels. In the short-term, the proposed harvesting could lead to slight shifts in big game use, which could lead to a shift in wolf use of the project area. Proposed harvesting activities on approximately 1,631 acres (67% of the project area) would alter canopy closure, summer big game habitat, and big game winter range habitat; proposed pre-commercial thinning on up to 1,428 acres (59% of the project area) would alter canopy closure and summer habitat. The modifications to summer range could alter some big game use of

the project area, and subsequently could alter the use of the project area by wolves. Proposed activities would occur on roughly 145 acres (81%) of mule deer winter range and 1,440 acres (69%) of elk winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 947 acres (65%) that likely have attributes facilitating considerable winter use by big game. Collectively, reductions in big game winter range habitats could redistribute big game, but would not be expected to appreciably alter wolf prey abundance. Thus, a low risk of direct and indirect effects would be expected to gray wolves since: 1) minor increases in human disturbance levels would occur, with no increases near known wolf den and/or rendezvous sites anticipated; and 2) changes to big game summer habitats and winter range could alter big game use of the project area, but would not appreciably alter prey availability.

Action Alternative: Cumulative Effects

Disturbance to gray wolves in a portion of the cumulative effects analysis area would be possible, but would only occur for the short-period of time that activities would be occurring. No changes in legal, motorized human access would be anticipated; minor increases in non-motorized access would be possible. Reductions in big game winter range would occur in a small portion of the cumulative effects analysis area; winter big game survival would not be expected to change appreciably. Reductions in cover in a small portion of the cumulative effects analysis area may cause slight changes in use by deer, elk, and moose; however, no appreciable changes in use within the cumulative-effects analysis area would be expected. These reductions in cover would be additive to losses from past timber-harvesting activities as well as any ongoing harvesting in the cumulative-effects analysis area, including potential salvage operations on the Rice Ridge wildfire area. No substantive change in wolf use of the cumulative-effects analysis area would be expected; wolves could continue to use the area in the long-term. Thus, a low risk of cumulative effects to gray wolves would be expected since: 1) elevated human disturbance levels would be short-lived and negligible changes to long-term disturbance levels would be anticipated with no increases near known wolf den and/or rendezvous sites; and 2) modifications to big game summer range and winter range could alter big game distributions, but no appreciable changes to wolf prey availability would be anticipated.

PILEATED WOODPECKERS

Issue

Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Introduction

The pileated woodpecker is one of the largest woodpeckers in North America and excavates the largest cavities of any woodpecker. Preferred nest trees are large diameter western larch, ponderosa pine, cottonwood, and quaking aspen trees and snags, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. Aney and McClelland (1985) described pileated nesting habitat as "...stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood

in stands (McClelland 1979).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (2,419 acres). Cumulative effects were analyzed on the 14,745-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support several pairs of pileated woodpeckers (Bull and Jackson 1995).

Existing Environment

Pileated woodpeckers have been documented near the project area in the past. In the project area, potential pileated woodpecker nesting habitat exists on approximately 334 acres (14% of the project area). These habitats are dominated by Douglas-fir and Douglas-fir/western larch. Additionally, 1,771 acres (73% of the project area) of sawtimber stands, dominated by Douglas-fir, Douglas-fir/western larch, and ponderosa pine exist in the project area, which may be potentially suitable foraging habitats. Ongoing salvage activities in the project area associated with the Rice Ridge wildfire is removing roughly 60 of sawtimber stands that may have been suitable pileated woodpecker foraging habitats before the fire. In the cumulative effects analysis area, roughly 510 acres (14%) of pileated woodpecker habitats exist on DNRC-managed lands dominated by Douglas-fir. An additional 2,648 acres (74%) of potential feeding habitats exist on DNRC managed lands within the cumulative effects analysis area. The recent Rice Ridge wildfire burned roughly 1,801 acres in the cumulative effects analysis area, which likely created additional snag habitats and dead wood resources for pileated woodpeckers, but also opened up the canopies of many of those stands due to fire severity. Much of this burned area was on USFS-managed lands and approximately 517 acres of burned forest in the cumulative effects analysis area is proposed for salvage logging. Proposed salvage logging on USFS-managed lands would likely retain some snags within proposed units and extensive un-salvaged areas would also persist on USFS-managed lands, thus reductions in snag habitats on USFS lands would be minimal. Some suitable habitats likely exist on a portion of the 5,098 acres of reasonably closed forested habitats on other ownerships in the cumulative effects analysis area (35% of non-DNRC lands), and some of the 3,400 acres of moderately stocked forested stands on those other ownerships could also be suitable foraging habitats (23% of non-DNRC lands). Much of the 6,261 acres (42%) of shrubs, herbaceous areas, poorly stocked forested stands, burned habitats, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful to pileated woodpeckers. Across the cumulative effects analysis area, ongoing tree mortality is reducing forested cover while increasing the amount of dead wood resources available for pileated woodpeckers.

Environmental Effects-Pileated Woodpecker

No Action Alternative: Direct and Indirect Effects

A negligible risk of adverse direct and indirect effects to pileated woodpeckers would be expected since: 1) no harvesting would occur; 2) no further changes in the amount of continuously forested habitats would be anticipated; 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated; and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

No Action Alternative: Cumulative Effects

No disturbance of pileated woodpeckers would occur. Continued use of the cumulative-effects analysis area by pileated woodpeckers would be expected at similar levels as presently occurring. Thus, a negligible risk of adverse cumulative effects to pileated woodpeckers would be expected since: 1) no further changes to existing habitats would occur; 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated; and 3) long-term, succession-related changes in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

Action Alternative: Direct and Indirect Effects

Pileated woodpeckers can to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by any proposed activities that could occur during the nesting period. Proposed activities would not occur between April 1 and June 15, which would prevent potential disturbance during the early nesting season, but activities could disturb pileated woodpeckers should they occur during the later parts of the nesting season. Harvesting would reduce forested habitats for pileated woodpeckers in the project area. Roughly 233 acres (68%) of the potential nesting habitat along with 1,292 acres (73%) of potential foraging habitats would be harvested. Some of this area could be dense enough to receive some use by foraging pileated woodpeckers following proposed treatments, but most of these stands would be temporarily unsuitable for pileated woodpeckers due to the openness of the stands following proposed treatments. Quality of these potential pileated woodpecker habitats would be reduced for 20-40 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed harvest areas. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), pileated woodpecker densities in the project area would be expected to be reduced on 1,631 acres. The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir while promoting the growth and/or regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Proposed activities would be additive to the reductions in snags, canopy closure, and any potential disturbance associated with ongoing salvage logging in the project area. The proposed pre-commercial thinning and planting could improve potential pileated woodpecker habitat quality into the future. Thus, a minor risk of adverse direct and indirect effects to pileated woodpeckers would be anticipated since: 1) harvesting would reduce the amount of continuous-forested habitats available; 2) potential nesting habitats and foraging habitats would be removed; 3) snags and snag recruits would be removed; however, mitigation measures to retain some snags and snag recruits would be included, and 4) proposed treatments would promote seral species in the project area.

Action Alternative: Cumulative Effects

Reductions in pileated woodpecker habitat quality and the amount of continuously forested habitats available for pileated woodpeckers would occur. On DNRC-managed lands in the cumulative effects analysis area, roughly 277 acres (54%) of pileated woodpecker nesting and 1,356 acres (51%) of foraging habitats would not be altered. Any ongoing harvesting in the cumulative effects analysis area, including potential salvage harvesting associated with the Rice Ridge wildfire, could continue altering potential pileated woodpecker habitats. Snags, coarse woody debris, and potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities. Modifications to pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting and recent wildfire activity; continued use of the cumulative effects analysis area would be anticipated, but likely at a slightly reduced level. Continued maturation of

stands across the cumulative-effects analysis area would provide future pileated woodpecker habitats. Thus, a minor risk of adverse cumulative effects to pileated woodpeckers would be anticipated since: 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative-effects analysis area; 2) potential nesting and foraging habitats would be modified, but some habitats would persist in the cumulative-effects analysis area; 3) snags and snag recruits would be removed; however, mitigation measures would retain some of these attributes; and 4) proposed treatments would promote seral species in a portion of the cumulative effects analysis area.

BIG GAME

BIG GAME WINTER RANGE

Issue

Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

Introduction

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose. Thus, removing cover that is important for wintering big game through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local big game herds.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 2,419-acre project area. Cumulative effects were analyzed on the combined winter ranges in the 24,849-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Existing Environment

Montana Department of Fish, Wildlife, and Parks identified mule deer (178 acres) and elk (2,081 acres) winter range in the project area. These winter ranges are part of larger winter ranges in the area. Mature Douglas-fir, with lesser amounts of mixed conifer stands, in the project area are providing attributes facilitating use by wintering big game. Approximately 1,448 acres of the project area (60%) appear to be providing snow intercept and thermal cover attributes for big game. Approximately 60 acres of potential elk winter range burned in the project area during the recent Rice Ridge wildfire and is currently being salvage logged. The wildfire reduced much of the canopy closure, thermal cover, and snow intercept in that small part of the project area. Evidence of non-winter use by deer, elk, and moose was noted during field visits.

Roughly 9,090 acres of composite deer and elk winter range (37% of the cumulative effects analysis area) exist in the cumulative effects analysis area; at least 6,034 acres (24%) of the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. The recent Rice Ridge wildfire burned roughly 10,201 acres of the cumulative effects analysis area, including roughly 1,636 acres within this composite winter range. Approximately 2,134 burned acres (19%) are proposed for salvage logging on USFS lands. Much of the canopy closure, snow-intercept, and thermal cover capacities in these burned areas was reduced; limited or no use of the burned areas during the winter by big game would be anticipated. Additionally, in the recent past, timber harvesting within the cumulative effects analysis area has reduced thermal cover and snow intercept. Portions of the cumulative effects analysis area are in non-forested, herbaceous, or shrub types, which would not be expected to provide thermal cover or snow intercept in the future. Human disturbance within the winter range is associated with residential development, agricultural activities, recreational snowmobile use, commercial timber management, and several roads.

Environmental Effects-Big Game Winter Range

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to big game winter range would be anticipated since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would be anticipated; and 3) human disturbance levels would not change.

No Action Alternative: Cumulative Effects

Continued winter use of the larger winter range would be expected. No further changes in thermal cover and snow intercept would be anticipated. Human disturbance levels would be anticipated to continue at current levels. No appreciable changes to big game distribution or habitat use would be anticipated. Thus, no cumulative effects to big game winter range would be expected since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would occur; and 3) human disturbance levels would not change

Action Alternative: Direct and Indirect Effects

Proposed activities could occur in the winter, and disturbance created by mechanized logging equipment and trucks could temporarily displace big game animals during periods of operation for 3 to 5 years. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. There would be short-term added risk of disturbance and displacement of wintering animals that could result in moderate adverse effects associated with logging operations, short term road construction, and road use in the project area. However, no long-term effect to winter range carrying capacity or factors that would create long-term displacement or reduced numbers of big game would be anticipated.

Proposed activities would occur on roughly 145 acres (81%) of mule deer winter range and 1,440 acres (69%) of elk winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 947 acres (65%) that likely have attributes facilitating considerable winter use by big game. Following proposed activities, canopy densities in these stands providing snow intercept and thermal cover would be reduced, reducing habitat quality

for wintering big game. In general, it could take 30 to 50 years for these stands to regenerate and attain a size capable of providing thermal cover for big game. Proposed activities would not prevent big game movement through the project area appreciably in winter and could stimulate browse production in the units. Proposed pre-commercial thinning or planting would not appreciably alter winter range attributes, but could shorten the time before some of these stands provide these attributes to big game in the future. Thus, a moderate risk of adverse direct or indirect effects to big game winter range would be anticipated since: 1) the relatively short-term that logging activities could create disturbance in this area; 2) harvesting would alter a relatively high amount of the stands that are providing thermal cover and snow intercept habitats for big game species; and 3) portions of winter ranges for several species of big game would be altered.

Action Alternative: Cumulative Effects

Disturbance and displacement associated with this alternative could be additive to any displacement associated with ongoing activities in the cumulative effects analysis area and any other disturbances that may be affecting wintering big game. Similarly, any harvesting that may be occurring in the cumulative effects analysis area, including any potential salvage logging, could continue altering big game winter range and/or disturbing big game. Proposed activities would reduce canopy closure on 1,440 acres of winter range (16%) and roughly 947 acres (16%) of forested stands that appear to have attributes facilitating considerable use by wintering big game. Modifications to thermal cover and snow intercept in the project area could further alter the amount of the larger winter range providing these attributes for big game. Continued use of the larger winter range would be expected. Thus, a minor risk of adverse cumulative effects to big game would be anticipated since: 1) the relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area; 2) a small percentage of the larger winter range would be altered; 3) availability of lower-quality cover in the vicinity that provides some opportunity for big game should they be displaced.

BIG GAME SECURITY HABITAT

Issue

Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Introduction

Timber harvesting can increase vulnerability of big game animals by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, moose, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters, or they may become displaced or reduced in numbers due to lowered effective carrying capacity of the local habitat. Reduced cover attributable to logging and roads can also influence the effective use of habitat for big game species. Big game security habitat are nonlinear blocks of hiding cover that are more than 0.5 mile from open roads and are a minimum of 250 acres in size. For the purpose of this analysis, cover was considered generically as big game cover for deer, elk, and moose. Because elk are highly social, wide-ranging species, providing for their cover needs helps ensure that habitat needs for other ungulates, such as deer and moose are met as well. Because of their smaller

size and behavioral differences, mule deer and white-tailed deer are able to use smaller cover patches more effectively for escape and security. Moose are a solitary, wide-ranging species capable of effectively using relatively small cover patches, and the hunting season for moose is heavily regulated, greatly reducing risk of overharvest by humans. Therefore, for this analysis it is assumed that if available security cover would provide for the needs of elk, it would also generally be adequate to meet the needs of moose, mule deer, and white-tailed deer.

Analysis Area

Direct and indirect effects were considered at the scale of the project area (2,419 acres). Cumulative effects were analyzed on the 24,849-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Existing Environment

Hiding cover is abundant in the project area. There are limited (3.9 miles) open roads in the project area. The locations of these roads and the presence of open roads just off DNRC-managed parcels would be anticipated to have effects to big game that would be similar to areas with higher levels of motorized access. Extensive non-motorized access to the project area exists given the presence of the open roads, the relatively gentle terrain, and the 26.5 miles of restricted roads in the project area. A fairly large portion of the project area does not contain big game security habitats due to the proximity to open roads, however roughly 673 acres (28% of project area) are distant enough and contain sufficient cover to be able to contribute to larger blocks of potential security habitat that extend beyond the project area.

Hiding cover varies within the cumulative effects analysis area with the recent modifications from timber management and other human activities as well as the recent wildfire, but the combination of topography, distance from open roads, and the presence of vegetation likely provides adequate cover for elk during the hunting season in at least parts of the cumulative effects analysis area. The recent Rice Ridge wildfire burned roughly 10,201 acres of the cumulative effects analysis area and approximately 2,134 burned acres (19%) are proposed for salvage logging on USFS lands. In the cumulative effects analysis area, access for recreational hunting is relatively high, with numerous open roads (at least 58 miles, 1.5 miles/sq. mile) that facilitate access and numerous restricted roads (at least 146 miles; 3.8 miles/sq. mile) that could be used for non-motorized use. Within the cumulative effects analysis area, 5 patches (total of 7,104 acres; 29%) of potential security habitat exist. All 5 of these patches extend beyond the cumulative effects analysis area and contribute to larger blocks of potential security habitats. However, portions of the smaller 3 patches burned in the recent Rice Ridge wildfire and hiding cover was likely reduced in much of those blocks, but the distance from open roads, steep topography, and limited amounts being included in potential USFS salvage units would likely facilitate some use as big game security habitats. The blocks of potential big game security habitat in the project area do not contribute to these 3 blocks that burned, rather contribute to the 2 larger blocks in the southern portion of the cumulative effects analysis area.

Environmental Effects-Big Game Security Habitat

No Action Alternative: Direct and Indirect Effects

No forest management activities would occur in the project area. No risk of adverse direct or indirect effects to security habitat for moose, elk, mule deer, and white-tailed deer would be expected since: 1) no changes in existing security habitat would be anticipated and continued maturation of forest cover would improve big game security habitat; 2) the

level of public access to the project area would not change; and 3) no appreciable changes to big game survival would be anticipated.

No Action Alternative: Cumulative Effects

No further changes in big game security habitat would be anticipated. Past harvesting has altered big game security habitat and allowed increased human access and any ongoing salvage harvest associated with the Rice Ridge wildfire could continue to alter big game security habitats. Continued maturation in previously harvested stands in the cumulative-effects analysis area would improve hiding cover in those areas. No other changes in disturbance to big game and potential mortality due to hunting would be anticipated. Thus, no adverse cumulative effects to big game security habitat would be anticipated since: 1) no further reductions in big game security habitat would occur and modest levels of security habitat and hiding cover would persist within the cumulative-effects analysis area; 2) no changes in open roads, motorized access, or public access would occur; and 3) no appreciable changes to big game survival would be anticipated.

Action Alternative: Direct and Indirect Effects

Tree density within proposed units would be reduced on roughly 1,631 acres, including roughly 418 acres (62% of existing security cover) of forested stands in the project area contributing to big game security habitat. Hiding cover would be reduced within the proposed units, but would improve as trees and shrubs become reestablished in the openings over the next 10-20 years. The retention of structure within proposed units and unharvested areas between the various units, including extensive wetlands and riparian habitats would reduce the potential effects of the hiding cover reductions. Slight increases in sight distance would be anticipated. Proposed thinning would also increase sight distances while also altering hiding cover. Overall, changes to sight distance and hiding cover would have minor effects to big game vulnerability risk in the project area. No changes in open roads or motorized access for the general public would occur. During all phases of the project, any roads opened with project activities would be restricted to the public and closed after the completion of project activities. Slight increases in non-motorized access would occur with the proposed construction of approximately 2 miles of restricted roads. Numerous contract stipulations would minimize the effect on the existing big game security habitat by prohibiting contractors from carrying firearms while conducting contract operations and prohibiting contractors from accessing restricted areas for other purposes, such as hunting. Collectively, a minor risk of adverse direct and indirect effects to big game security habitat would be anticipated since: 1) reductions to existing hiding cover would reduce the quality of the big game security habitat in the project area; 2) no appreciable changes in open roads or motorized access for the general public would be anticipated and minor increases in non-motorized access would occur that could alter hunter access; and 3) negligible changes in big game survival would be anticipated.

Action Alternative: Cumulative Effects

Alterations of cover could reduce the quality of big game security habitat in a small portion of the cumulative effects analysis area and would be additive to past reductions in the cumulative effects analysis area. Proposed salvage logging on USFS-managed lands could further reduce available hiding cover and/or security habitats in the cumulative effects analysis area. Continued maturation across the cumulative-effects analysis area would improve hiding cover and big game security habitat. No changes in public, motorized access and negligible increases in non-motorized access would be expected, which would not affect big game vulnerability in the cumulative effects analysis area. Negligible effects to

big game survival would be anticipated. Thus, a minor risk of adverse cumulative effects to big game security habitat would be anticipated since: 1) quality of hiding cover in a small portion of the cumulative effects analysis area would be reduced, which would reduce the quality of the big game security habitat, but security habitat and hiding cover would persist in the cumulative-effects analysis area; 2) no changes in open roads or motorized access for the general public would be expected and only negligible increases in non-motorized access would occur that would alter hunter access; and 3) negligible changes in big game survival would be anticipated.

Wildlife Mitigations

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Minimize potential for disturbance to grizzly bears and numerous avian species by restricting activities between April 1 and June 15.
- Motorized public access will be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Contractors and purchasers conducting contract operations will be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants will be stored in a bear-resistant manner.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units in lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fire and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.

- Retain a minimum of 100 acres of lynx habitats in the pre-commercial thinning units in the Seeley Lake Lynx Management Area unthinned to provide denser stands for snowshoe hares, targeting stands with higher existing densities.

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